THE ARCHITECTS' LIBRARY

A HISTORY OF ARCHITECTURAL DEVELOPMENT

BY F. M. SIMPSON

VOL. I.

ANCIENT, EARLY CHRISTIAN AND BYZANTINE

R. C. Houghton.

2 vols

22/6

F. C. Robson.

April. 1910

THE ARCHITECTS' LIBRARY

EDITOR: F. M. SIMPSON, F.R.I.B.A.

THE ARCHITECTS' LIBRARY

Edited by F. M. SIMPSON, F.R.I.B.A.
Professor of Architecture, University College, London

A History of Architectural Development.
By F. M. SIMPSON, F.R.I.B.A. With numerous Illustrations. Three Volumes. Medium 8vo.

Vol. I. ANCIENT, EARLY CHRISTIAN, AND BYZANTINE. 12*s.* 6*d.* net.
II. MEDIÆVAL. [*In the Press.*
III. RENAISSANCE. [*In the Press.*

Building Construction.
By BERESFORD PITE, F.R.I.B.A., Professor of Architecture, Royal College of Art, South Kensington, and others. Two Volumes. Medium 8vo. [*In the Press.*

Other Volumes in contemplation

LONGMANS, GREEN, AND CO.
LONDON, NEW YORK, AND BOMBAY

THE ARCHITECTS' LIBRARY

A HISTORY OF ARCHITECTURAL DEVELOPMENT

IN THREE VOLUMES

VOL. I

BY

F. M. SIMPSON

ARCHITECT

PROFESSOR OF ARCHITECTURE, UNIVERSITY COLLEGE, LONDON;
FELLOW OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS; SOMETIME PROFESSOR
OF ARCHITECTURE IN THE UNIVERSITY OF LIVERPOOL;
ROYAL ACADEMY TRAVELLING STUDENT, 1884

WITH ILLUSTRATIONS

LONGMANS, GREEN, AND CO.
39 PATERNOSTER ROW, LONDON
NEW YORK AND BOMBAY
1905

All rights reserved

Digitized by the Internet Archive
in 2026

https://archive.org/details/historyofarchite0001fmsi_d9c6

PREFACE

THIS volume was commenced a few years back, but, owing to various causes, has only recently been finished.

Its aim is to trace the development of architecture through the planning, construction, materials and principles of design of the buildings described, and to try and indicate the broad lessons which may be learned from them. No one practising architecture, however able he may be and however keen his imagination, can afford to ignore these lessons. For the history of architecture is the history of evolution; and all work in all countries and at all periods has been evolved from preceding efforts. Various influences from time to time have combined to give to the buildings of each country their distinctive character; and it is in the successful solution of the difficulties which arose in consequence of these that the value of architectural studies lies. Such influences are—religion, climate, tradition, geographical situation, the materials available, the condition of the labour market, the wealth or poverty of a people, their life, character, and requirements: these and others have made themselves felt in turn; some with great power, others with less effect.

In treating, therefore, of architectural development, these factors cannot be ignored. The connection between countries and the influence which one country exercised upon another also require consideration, otherwise the links binding their arts together remain hidden. An analysis of these is necessary in dealing with the early work which fills this volume—work extending from the Pyramid days of old Egypt to about 1000 A.D., the year in which it was foretold the world would come to an end.

In the two volumes to follow, such examination will not be so essential, as there is a vast difference between treating of architectural art extending over 5000 years, and of the art of the succeeding 800. The second volume will deal with Romanesque and Mediæval Architecture throughout Europe; and the third with the Renaissance.

In order to be able to speak from personal experience of the buildings, etc., referred to in this book, I have made several tours, visiting Italy, Sicily, Greece, Turkey, and Asia Minor. Egypt, Assyria and Persia I have not seen; and for the descriptions of the work there, I am indebted to books and photographs.

The following authors have kindly given me permission to copy illustrations from their books: Mons. Choisy, Sig. Lanciani, Dr. Dörpfeld, Sig. Pulgher, Mr. T. G. Jackson, and Messrs. Schultz & Barnsley: and amongst the publishers and others who have accorded me a like privilege are Mons. Motteroz, and Mons. Béranger, of Paris; Herr Asher, of Berlin; Mr. Murray, The Clarendon Press, The Committee of the British School at Athens, The Council of the Hellenic Society, etc.

This history does not claim to be more than an introduction; but, as such, it is hoped that it may be of some help to students of architecture and to others interested in the art.

For those who may wish to study more thoroughly the work of any one period or country, a list of books of reference is appended, a few words being added to indicate the aim and scope of each.

Full particulars will be given in due course of the other volumes of the Library, which will be published from time to time.

F. M. SIMPSON.

University College, London,
October, 1905.

CONTENTS

PAGE

PREFACE v

LIST OF ILLUSTRATIONS ix

LIST OF BOOKS OF REFERENCE xv

CHAPTER

I. EGYPTIAN ARCHITECTURE 1

II. THE ARCHITECTURE OF THE ANCIENT EASTERN MONARCHIES: BABYLONIA, ASSYRIA, PERSIA, LYCIA 33

III. GREEK ARCHITECTURE: FIRST PERIOD 49

IV. GREEK ARCHITECTURE: SECOND PERIOD 56

V. GREEK ARCHITECTURE: SECOND PERIOD—*continued* 83

VI. ROMAN ARCHITECTURE 101

VII. THE BUILDINGS OF THE ROMANS 126

VIII. SASANIAN ARCHITECTURE 163

IX. EARLY CHRISTIAN ARCHITECTURE 168

X. BASILICAN CHURCHES—CIRCULAR AND MULTANGULAR CHURCHES—BAPTISTERIES AND TOMBS 185

XI. BYZANTINE ARCHITECTURE; INTRODUCTION AND FIRST PERIOD . . 213

XII. BYZANTINE ARCHITECTURE: SECOND PERIOD 235

XIII. CIRCULAR CHURCHES AND BAPTISTERIES 254

APPENDIX 259

LIST OF ILLUSTRATIONS

EGYPTIAN.

FIG.		PAGE
1.	A Vulture	1
2.	Pyramid of Cheops: Sections	4
3.	A Mastăba: Plan and Sections	6
4.	Entrance Front to Mastăba	7
5.	Lotus Stalk Column and Lotus Bud Capital at Beni-Hasan	8
6.	Tombs at Beni-Hasan	*facing* 8
7.	The Great Pylons at Karnak	„ 8
8.	Plan of Great Temple of Karnak, Thebes, and Section through Hypostyle Hall	10
9.	Plan of the Ramesseum	12
10.	Plan of Temple at Abydos	13
11.	Method of Lighting the Hypostyle Hall, Karnak	14
12.	Portion of Capital from Naucratis, Egypt. (Now in the British Museum.)	16
13.	Plan of Temple at Edfou	18
14.	Temple at Edfou, showing Columns and Screen Wall of Portico, and Top Lights	19
15.	Building at Elephantine: Plan and Section	20
16.	"Pharaoh's Bed" at Philæ	*facing* 20
17.	A Rocker	23
18.	Brick Elliptical Arch, and Stone Pointed Corbel Arch	25
19.	A. Column and Lotus Bud Capital, Karnak	27
	B. Column and Lotus Leaf Capital, Karnak	27
	C. Palm Leaf Capital, Philæ	27
	D. Scolloped Capital, Philæ	27
	E. Column at Kalabché	27
	F. Painted Columns, Karnak	27
	G. Hathor-headed Capital, Dendereh	27
20.	The "Gorge" Cornice	30
21.	Painted Patterns on Walls, Ceilings, and Beams	31

ASSYRIAN.

22.	Coloured Tiles from Khorsabad	33
23.	Plan of Sargon's Palace at Khorsabad	36

FIG. PAGE
24. Pointed Vault over Drain 38
25. Entrance Gateway, Khorsabad; Elevation and Section 39
26. Wood Capital carved with Spirals 40
27. Carved Stone Threshold. (Now in British Museum.) . . . *facing* 40

PERSIAN, ETC.

28. Entablature of a Rock-cut Tomb 42
29. Block-Plan of Persepolis 43
30. Plan of Great Hall of Xerxes at Persepolis 44
31. Persian Column; Capital and Base 45
32. Lycian Tomb. (Now in British Museum.) 47

GREEK: FIRST PERIOD.

33. Gold "Butterfly" Button from Mycenæ. (Now in Museum at Athens.) 49
34. Plan of Palace at Tiryns 53
35. Gateway of the Lions, Mycenæ 53
36. Tomb of Atreus, Mycenæ: Plan and Section 54
37. Dromos and Entrance Doorway to Tomb of Atreus, Mycenæ *facing* 54
38. Column at Eleusis 55

GREEK: SECOND PERIOD.

39. Plan of the Acropolis at Athens 59
40. Section of the Acropolis at Athens 60
41. The Doric Order, from the Parthenon: Elevations, Plans, Section and Details 62
42. The Ionic Order from the Erechtheum; Elevations, Plans and Details 63
43. Ionic Capital and Base, from Temple of Apollo at Bassæ, Phigaleia 65
44. Corinthian Capital from Epidaurus. (Now in Museum at Athens.) . . . . . *facing* 66
45. Corinthian Capital. (Now lying in the Theatre of Dionysus, Athens.) . . . . . *facing* 66
46. Plans of Temples at Rhamnus, Eleusis, Selinus, Bassæ, Epidaurus, Athens, etc. 68
47. Pilasters, Temple at Bassæ 71
48. East Portico of the Parthenon, shown in Section . . . . *facing* 72
49. Interior of Temple of Neptune at Pæstum, showing Internal Columns . . . . . *facing* 74
50. Plan of the Temple of Jupiter, Girgenti 75
51. West Front of the Propylæa, Athens . . . . . *facing* 76
52. North Porch of the Erechtheum . . . . . „ 78
53. The Erechtheum: Plan, and suggested West End 80

FIG. PAGE

54. Choragic Monument of Lysicrates, Athens . . . . . *facing* 82
55. Construction of Entablature of a Greek Temple 86
56. Orthostatæ at Olympia and Pæstum 87
Ancones from Acropolis Athens 87
Rebated Thin Wall, Olympia 87
Finished Margin, Angles of Wall 87
57. Sections of Marble Tiles from the Parthenon and from Bassæ . 88
58. Marble Antefixa and Roof-tile tilted at the Eaves 88
59. Hole in Bed of Drum of Column, Parthenon 89
60. Method of obtaining a Fine Joint in a Marble Wall, Propylæa, Athens 89
61. The Caryatid Porch of the Erechtheum . . . . . *facing* 94
62. Greek Ornament and Carving 96
63. Top of Stelé 98
64. Theatre at Epidaurus: Plans and Sections 99

ROMAN.

65. Details of Temple at Cori 107
66. The Orders 108
67. Details of the Roman Orders 109
68. Arch Construction and Entablature and Column Decoration, from Theatre of Marcellus 111
69. Vaulted Building with Few and Large Supports 113
70. Entablature bent round Arch 114
Entablature above Arch 114
71. Brick-faced Concrete and Stone-faced Concrete Walling . . . 117
72. Brick-faced Concrete Arch 118
73. Brick-faced Concrete Arch in Colosseum 118
74. Concrete Barrel and Intersecting Vaults, showing Construction of Ribs, etc. 120
75. Stone Barrel Vault, Baths of Diana, Nîmes 122
76. Method of fixing Marble Slabs to Concrete Wall 122
77. Mural Painting, Pompeii 124
78. Plan of the Forum of Trajan 127
79. The Basilica Ulpia (Restored Section) 129
80. Plan of the Basilica of Constantine 130
81. Mode of Building of the Romans: Interior of a Great Hall . . 131
82. Section of the Basilica of Constantine 132
83. Plan of the Maison Carrée, Nîmes 133
84. Entablature, Temple of Castor and Pollux 134
85. Plan of the Temple of Venus and Rome 135
86. Plan of Portico of Temple of Vespasian, Brescia 136
87. Plan of Surroundings of the Great Temple, Baalbec 137
88. Maison Carrée, Nîmes . . . . . *facing* 138

FIG. PAGE
89. The Pantheon, Rome . . . . . *facing* 138
90. Plan of the Pantheon 140
91. Section of the Pantheon 141
92. Circular Temple at Tivoli . . . . . *facing* 142
93. Plan of the Baths of Caracalla 144
94. Portions of Baths of Diocletian, now Church of Santa Maria degli Angeli 146
95. Plan and Construction of Vault, Baths of Gallienus 147
96. Domed Apse in Grounds, Hadrian's Villa, Tivoli 148
97. Plan of the Colosseum 150
98. Elevation and Section of the Colosseum 151
99. Amphitheatre at Pozzuoli, near Naples . . . . . *facing* 154
100. House of Pansa, Pompeii: View from Outer Courtyard . . . „ 154
101. Arch of Titus, Rome . . . . . „ 157
102. Pont du Gard, Nîmes 161

SASANIAN.

103. Plan of the Palace at Serbistan 164
104. Gallery in the Palace at Serbistan 165
105. Doorway in Palace at Firouz-abad, showing Stucco Mouldings . 165
106. Front of the Palace at Ctesiphon 166

EARLY CHRISTIAN AND BASILICAN.

107. Capital and Dosseret from S. Apollinare in Classe, Ravenna . 171
108. Plan of Syracuse Cathedral, an Old Temple converted into a Church 174
109. Longitudinal and Transverse Sections of S. Maria Maggiore, Rome 175
110. Plan of S. Agnese, Rome 176
111. Plan of S. Maria in Trastevere, Rome 176
112. Plan of S. Maria in Cosmedin, Rome 177
113. East End, S. Ambrogio, Milan 178
114. Plan of S. Clemente, Rome 179
115. Plan of S. Prassede, Rome 181
116. Detail of Mosaic Floor, S. Clemente, Rome 183
117. Outside Arcading, S. Apollinare in Classe, Ravenna 184
118. Interior of S. Maria in Trastevere, Rome . . . . . *facing* 184
119. Interior of S. Paolo fuori le Mura, Rome . . . . . „ 184
120. Chancel of S. Lorenzo fuori le Mura, Rome . . . . . „ 186
121. Plan of S. Lorenzo fuori le Mura, Rome 187
122. Interior of S. Clemente, Rome . . . . . *facing* 188
123. Cloisters, S. Giovanni in Laterano, Rome . . . . . „ 188
124. Plan of S. Apollinare in Classe, Ravenna 190
125. Plan of Torcello Cathedral 191

FIG. PAGE
126. Capital from Torcello Cathedral 192
127. Plan of Parenzo Cathedral 193
128. Plan of S. Sergius, Old Cairo 197
129. Plan of Church, Dair-as-Suriani 197
130. Plan of S. Demetrius, Salonica 199
131. West End of the Church at Tourmanin 200
132. Syrian Arches 201
133. Portion of Apse at East End of the Church at Kalat-Seman . 202
134. Plan and Sections of Church at Roueiha 203
135. Piers and Corbelled Shafts in the Church of Qalb-Louzeh . . 204
136. Plan of Church of S. Simeon, at Kalat-Seman 205
137. Plan of S. Stefano Rotondo, Rome 207
138. Section of S. Stefano Rotondo, Rome. 208
139. Plan of S. Costanza, Rome 209
140. Section of S. Costanza, Rome 209
141. Plan and Section of S. George, Salonica 210
142. Mausoleum of Theodoric, Ravenna: Plans, Elevation and Details 211

BYZANTINE.

143. Diagram of Domes carried on (*a*) Pendentives, (*b*) Pseudo-Pendentives, (*c*) Corbelling 214
144. S. Vitale, Ravenna; Section through Dome showing Pot Construction 217
145. Church of the Kapnikarea, Athens: Window and Brick and Stone Walling 218
146. Patterns formed by Cut-Bricks 219
147. Capital in Gallery, S. Vitale, Ravenna . . . . . *facing* 220
148. S. Sophia, Constantinople: Arcading at Sides, showing Capitals and Carving . . . . . *facing* 221
149. Capital from Church at Daphni, near Athens 222
150. Window, Grado Cathedral 222
151. Plan of Church at Ezra, Syria 225
152. Plan of SS. Sergius and Bacchus, Constantinople 225
153. Plan of S. Vitale, Ravenna 226
154. Plan of S. Lorenzo, Milan 227
155. Plan of S. Sophia, Constantinople 230
156. Interior of S. Sophia, Constantinople, shown in Section . . . 232
157. S. Sophia, Constantinople . . . . . *facing* 234
158. Mosaics on Dome, Church at Daphni, near Athens . . . . „ 234
159. Plan of S. Sophia, Salonica 237
160. Plan and Section of S. Irene, Constantinople 238
161. Plan of S. Theodore, Constantinople 239
162. West Front of S. Theodore, Constantinople 240
163. Plan of S. Elias, Salonica 241

FIG. PAGE
164. Plan of S. Mark's, Venice 242
165. Section of S. Mark's, Venice 243
166. S. Mark's, Venice: Interior . . . . . *facing* 245
167. S. Mark's, Venice: Portion of West Front . . . . . „ 245
168. Plan of Old Church and Belfry of S. Satiro, Milan 247
169. Plan of S. Fosca, Torcello 248
170. S. Fosca and the Cathedral, Torcello . . . . . *facing* 248
171. Section of Church at Daphni, near Athens 250
172. Church at Daphni; East End . . . . . *facing* 250
173. S. Theodore, Athens . . . . . „ 250
174. Plan of the Two Churches of the Monastery of S. Luke of Stiris, Greece 251
175. Plan of Church at Ala-Werdi 253

CIRCULAR CHURCHES, ETC.

176. Plan of Brescia Old Cathedral 254
177. Plan and Section of S. Thomaso in Limine, near Bergamo . . . 255
178. Plans of S. Donato, Cathedral, and Baptistery, Zara 256
179. Baptistery, Cathedral, and Leaning Tower, Pisa . . . . *facing* 257
180. Section of the Baptistery, Pisa 257

LIST OF BOOKS OF REFERENCE

[The aim has been to make this list as short as possible, not as long as possible. Other books are given in the catalogues of the R.I.B.A. and other libraries. The British Museum is exceptionally rich in examples of Egyptian, Assyrian, and Greek work. Persian work can best be studied in the "Susa" galleries of the Louvre, Paris.]

EGYPTIAN.

Choisy: L'Art de Bâtir chez les Egyptiens. — Construction.

Lepsius: Denkmäler, vols. i. and ii. (plans especially). *Mariette:* Voyage dans la Haute Egypte (sculpture especially). *Prisse d'Avennes:* Histoire de l'Art Egyptien (coloured plates of capitals and decoration). Description de l'Egypte, vols. i. to iv. — Plates.

Petrie: History of Egypt. *Perrot and Chipiez:* Histoire de l'Art, vol. i. (translated). — General.

ASSYRIAN.

Place: Ninive et l'Assyrie (plans, etc.). — Plates.

Perrot and Chipiez: Histoire de l'Art, vol. ii. (translated). — General.

PERSIAN, ETC., AND SASANIAN.

Flandin and Coste: Voyage en Perse. *Dieulafoy:* L'Art Antique de la Perse. *Texier:* Description de l'Arménie, la Perse, et la Mésopotamie. — Plates.

Perrot and Chipiez: Histoire de l'Art, vol. v. (translated). — General.

GREEK: FIRST PERIOD.

Blouet: Expedition scientifique de Morée. — Plates.

Schliemann: Mycenæ (chiefly discoveries in tombs). *Evans and Fyfe:* The Minôan Palace of Knossos, Crete (*R.I.B.A. Journal*, 1903). *Perrot and Chipiez:* History of Art in Primitive Greece. — General.

GREEK: SECOND PERIOD.

Choisy: Histoire de l'Architecture, vol. i. (deals also with Egyptian, Persian, Roman, etc.) *Penrose:* An Investigation of the Principles of Athenian Architecture (good plans of Parthenon, etc.). — Construction.

Plates. *Cockerell:* Temples at Ægina and Bassæ. *Koldewey and Puckstein:* Die Griechischen Tempel in Unteritalien und Sicilien (plates show present condition of temples). *Middleton and Gardner:* Plans and Drawings of Athenian Buildings (Acropolis and Erechtheum). *Stuart and Revett:* Antiquities of Athens. *Texier:* Description de l'Asie Mineure.

Orders. Normand (or Mauch) Parallel of the Orders (also Roman).

Detail. *Watt:* Examples of Greek and Pompeian Decorative Work.

ROMAN.

Construction. *Choisy:* L'Art de Bâtir chez les Romains (invaluable, very fine drawings). *Middleton:* The Remains of Ancient Rome (also general).

Plates. *Taylor and Cresy:* Architectural Antiquities of Rome (good details of temples, etc.). *Wood:* Ruins of Palmyra; Ruins of Baalbec. *Adam:* Palace of Diocletian at Spalato. *Canina:* L'Architettura Romana (valuable for plans, but often incorrect in detail). *Lanciani:* Map of Rome (excellent; several maps to good scale, showing old buildings and modern surroundings). *Piranesi:* Engravings (brilliant drawings of buildings as existing in the eighteenth century).

Detail. *D'Espouy:* Fragments d'Architecture Antique.

EARLY CHRISTIAN.

Plates. *Hubsch:* Monuments de l'Architecture Chrétienne (especially for plans). *Bunsen:* Die Basiliken des Christlichen Roms (good plans). *Isabelle:* Les Édifices Circulaires (these three for Italian churches). *De Vogüé:* Syrie Centrale (a standard work). Les Églises de la Terre-Sainte. *Texier and Pullan:* Byzantine Architecture (for basilican churches in Salonica, etc.) (these three for Eastern churches).

General. *Butler:* The Ancient Coptic Churches of Egypt. *Scott:* An Essay on the History of English Church Architecture (chapters i. and ii.). *Cattaneo:* Architecture in Italy from the Sixth to the Eleventh Century (archæological, but contains plans and details).

BYZANTINE.

Construction. *Choisy:* L'Art de Bâtir chez les Byzantins.

Plates. *Salzenberg:* Altchristliche Bandenkmale von Constantinopel (invaluable for S. Sophia, and contains plates of other churches). *Texier and Pullan:* Byzantine Architecture (good plates and good historically). *Schultz and Barnsley:* The Monastery of S. Luke of Stiris, in Phocis (a valuable monograph of two typical churches). *Couchard:* Choix d'Églises Byzantines en Grèce. *Pulgher:* Les Anciennes Églises Byzantines de Constantinople.

General. *Van Millengen:* Byzantine Constantinople. *Lethaby and Swainson:* The Church of Sancta Sophia, Constantinople.

A HISTORY OF ARCHITECTURAL DEVELOPMENT

FIG. 1.
Prisse d'Avennes (Bertrand).

CHAPTER I.

EGYPTIAN ARCHITECTURE.

Introduction.

THE oldest civilization of which authentic particulars are known is that of Egypt. It is, therefore, only natural that the commencement of architecture should be on the banks of the Nile; especially as the Egyptians were essentially a building race, eager to raise vast monuments to commemorate their greatness. This ambition of theirs is equally evident in the work of the early dynasties at Memphis, and in that of the later ones at Thebes. The Pharaohs, at all periods, had excellent building materials ready to hand, and thousands of workers who could be pressed into their service; they were possessed of great wealth, which enabled them to realize their aspirations, and in consequence they have left monuments far surpassing in size and magnificence those of any other race of monarchs, the Roman Emperors not excepted. As Champollion said, "No people, either ancient or modern, have had a national architecture at once so sublime in scale, so grand in expression, and so free from littleness as that of the ancient Egyptians." The scale startles even more than the artistic excellence delights. Their command

of unskilled labour enabled them to do what no other nation has ever been able to attempt. In the early period, at least, a few overseers to direct, a few artificers learned in the art of cutting stone, were all that was necessary; the rest was due to brute force. Herein lies the secret of the pyramid builders, and also of much of the subsequent work of the later dynasties.

Egyptian dynasties and kingdoms.

Egyptian art is generally divided according to the different dynasties of kings, partly from a list compiled by Manetho, an Egyptian priest who lived in the third century B.C., and partly from monuments and papyri which have been discovered and deciphered. From these sources Egyptologists have been able to decide, with a fair amount of certainty, to which dynasty each king belongs, the duration of his reign, the buildings he erected, and his successes or failures in the wars he waged. Recent discoveries by Professor Flinders Petrie and others point to a still earlier civilization than that recorded by Manetho; to a predynastic period in which decorative art was already considerably advanced, as the objects found prove, although no architectural remains exist.

For architectural purposes a simpler division is into kingdoms. The first is the Memphite kingdom, when Memphis (now Cairo) was the capital; the second, the Theban, when the capital had been moved further south up the Nile to Thebes; and the third, the Greek and Roman occupations, when Alexandria was the principal city.

Periods.

The period covered by the Memphite kingdom is somewhat uncertain, but may be taken to extend from about B.C. 4000 to about B.C. 3000. After an interval commences the first Theban kingdom (*c.* B.C. 2500), which lasted for two hundred years. Another interval then occurs, during which time Egypt was governed by an alien race, the Hyksos, and that is succeeded by the second Theban kingdom, which is the great period of Egyptian art. This extends from the eighteenth century B.C. to the thirteenth, and includes the reigns of Rameses I., Seti I., and Rameses II. (1400–1300 B.C.). After that there was a lull in building activity; but a revival took place in the seventh century B.C. under Psammetichus, who, together with his successors, encouraged the Greeks to settle in Egypt. In 525 B.C. the country was conquered by the Persians under Cambyses, and two centuries later by Alexander the Great. After his death in 323 B.C. the era of Greek rule commenced under the Ptolemies, which lasted until the death of Cleopatra. From B.C. 27

for over three hundred years Egypt was a Roman province, and although building continued in the older centres, the most important cities were those nearest to the Mediterranean.

The Memphite Kingdom of the Pyramid Builders.

The vast monuments of this period cover an area on the west side of the Nile, about fifteen miles long, and from two to two and a half miles broad. They are of two kinds: (1) Pyramids, or royal tombs; (2) private tombs, commonly called mastăbas. Both are evidence of the ruling idea of Egyptian religion, namely, the worship of the dead, and both proclaim that even at that early age the building instincts of the Egyptians were very largely developed. All primitive races covered their dead with a mound of earth, and the pyramids, after all, are nothing but gigantic mounds, built of stone instead of earth. They can hardly be said to possess architectural pretensions, but, from their vast size and imposing appearance, as well as from the fact that they are the oldest structures of civilized times, they have always aroused the keenest interest.

Examples.

The oldest pyramid is that at Medum, erected by Seneferu, a king of the third or fourth dynasty (*c.* B.C. 3800), and the three largest and most famous are those at Gizeh. The largest of all, known as the Great Pyramid, is the tomb of Cheops; the two smaller are the tombs of Chephren and Mycerinus respectively. All face the north, and the entrance to each was on that side. They are built of squared blocks of stone, and are solid, with the exception of the chamber to receive the sarcophagus containing the preserved body of the dead king, and of the corridors which lead to it. The pyramids at Gizeh, and most of the other examples, are true pyramids, of one slope from top to bottom; but the pyramid at Medum, and another early example at Sakkarah, are "stepped pyramids;" that is to say, they rise in stages, each stage being at an angle of 75° The pyramids were faced with limestone or granite, the latter being used for the lower portion of the pyramid of Mycerinus. The facing blocks were of great size, and were laid with horizontal beds; the face of each block being worked to the required angle, and then polished.

Dimensions.

The pyramids of Gizeh were set out with great care and mathematical accuracy, which is shown conspicuously in the

Great Pyramid. Although its mean length at the base is 755·8 feet, the difference between the longest side and the shortest is only 1·7 of an inch. The height of this pyramid is 481·4 feet, and the angle of the casing to the horizon is 51°·52, which is about the usual slope, although all the examples vary slightly.

Arrangements for secrecy.

The ruling principles on which the pyramids were erected

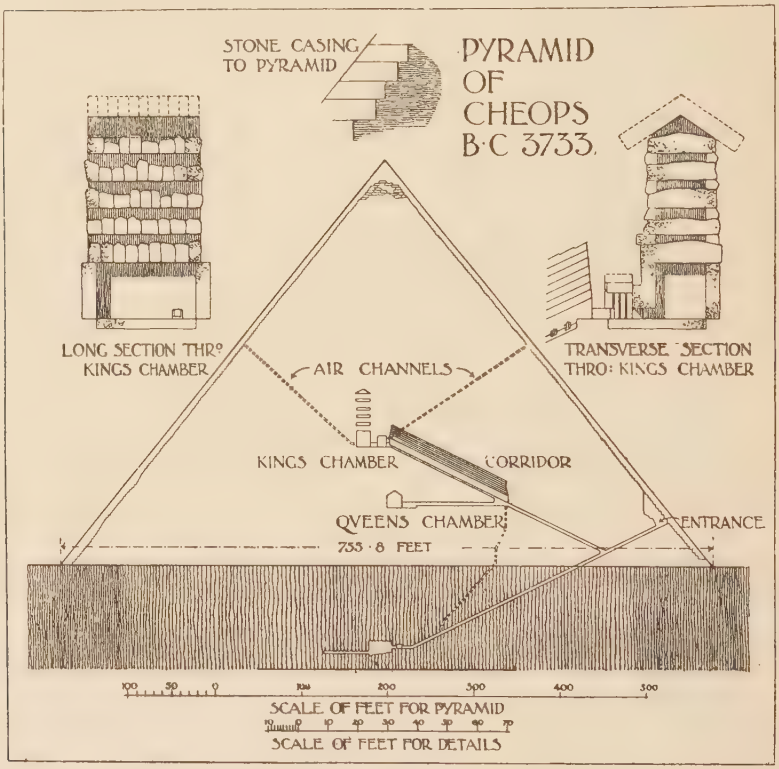


FIG. 2.

Prisse d'Avennes (*Bertrand*).

were everlasting durability and eternal secrecy. The entrance to each was carefully concealed, the body was hidden away, and special care was taken to guard against its discovery and profanation. These elaborate precautions have been in vain; hardly a pyramid exists which has not been entered and rifled at some period or another. Owing to the fact that the interior was intended to remain for ever a sealed book, no decoration or

ornamentation is to be found inside, although in most instances the mummy chamber and the corridor leading to it are lined with stone, or granite carefully finished. The position of the mummy chamber differs in each pyramid. It is either excavated in the rock underneath, so that the mass over is quite solid, as in the case of the pyramid of Mycerinus, where the chamber is 33 feet below the lowest course of stone, or it is enclosed within the pyramid itself. In that of Cheops, it is placed about one-third of the height of the pyramid above the ground level.

Internal construction.

Elaborate, although somewhat primitive, precautions were taken to prevent the heavy mass above crushing the roofs over the corridors and chambers. In the Great Pyramid, the principal chamber, 17 feet wide and twice as long, has tiers of lintels over it, with a space between each, and above these huge lintels stones slope upwards and butt against one another in order to throw the weight to the sides (see Fig. 2). The corridor is roofed on the "corbel" principle: each course of stone projects slightly beyond that immediately below it, thus gradually diminishing the width, until the opening at the top is sufficiently narrow to be spanned by lintels.

Temples.

On the east side of each pyramid was a detached building which formed the temple. Here the priests and relatives of the deified king met to do him homage, to pray for his well being, and to ask for his protection and guidance. Very scanty remains of these temples exist, although the one in front of the Sphinx, which these probably resembled, is in a fair state of preservation.

Mastăbas.

Round the pyramid of each Pharaoh were grouped the tombs of his wives, children, and dependants, together with those of the lords and high personages of the realm. These private tombs, or mastăbas[1] are smaller than the royal tombs, and differ from them in many respects. They are sometimes square and sometimes oblong in plan, have sides which slope at a much steeper angle than those of the pyramids, generally 75°, and are flat topped, although it has been suggested that they were originally crowned by pyramids. The principal difference between them and the royal tombs, however, is that the outer entrance is not concealed, but leads into a chamber, the walls of which are often decorated with representations of everyday life. These

[1] The stepped pyramids at Medum and Sakkarah are sometimes called mastăba pyramids.

low-relief pictures of oxen ploughing, of men and women crushing grapes, winnowing corn, picking flax, or stacking the crops, are of the greatest interest, and afford absolutely reliable proof of the manners and customs of the people.[1] This outer chamber, or vestibule, takes the place of the temple attached to each pyramid, and here the relatives came with offerings of food and drink for the deceased, or rather for his ka, or double, who had to be propitiated and fed. On the side facing the east is a recess containing the stele, or tablet, which was supposed to represent the doorway which gave access to the mummy chamber, and towards this the celebrants turned. As a matter of fact, the real entrances are in all cases as carefully concealed as those of the pyramids. The mummy chamber is always immediately below the vestibule, and is excavated in the rock. It is approached by a pit, generally 40 feet deep, but sometimes as much as 80 feet, also cut in the solid rock. Surrounding or behind the vestibule are walled-up corridors called serdabs, having little or no connection with it, which contained one or more statues of the deceased, intended to perpetuate his memory in case the embalmed body should by any chance be destroyed. These mastăbas, therefore, consist of a vestibule which contained the stele—when the vestibule was omitted, as sometimes happened, the stele was placed in a recess in the outer wall—a pit leading to the excavated mummy chamber, and one or more serdabs. Their construction is very solid; in fact, the area covered by the walls is generally greater

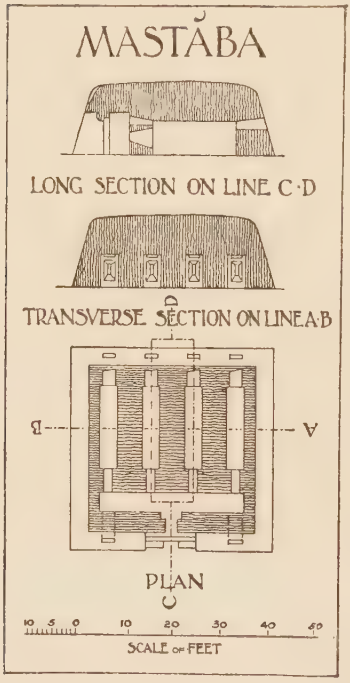


FIG. 3.
Mariette (Welter.)

[1] It is from these decorations, and from the numerous models in wood illustrating the life at that time, which are constantly being dug up—models of granaries, bakeries, etc., of ships, manned by sailors, with masts, sails, and oars complete—that our knowledge of this early civilization is so extensive.

than that of the vestibules and serdabs put together. Architectural expression is often given to the external fronts by means of panels carved in low relief and divided from one another by pilasters cut in the stone, in imitation of wooden construction of an earlier period.

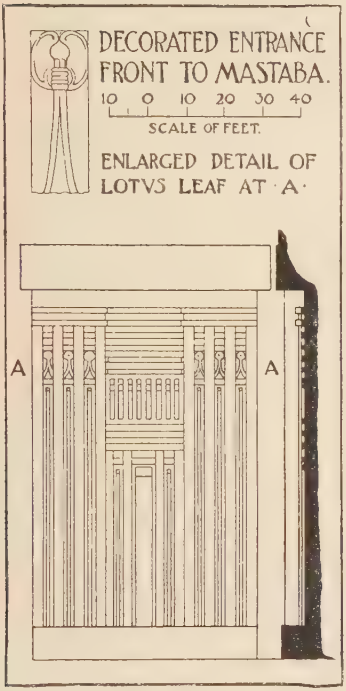


Fig. 4.

The Sphinx.

With the monuments of the first period may be classed the great Sphinx at Memphis, that wonderful tribute to Egyptian perseverance and love for size, although it is not certain to what period it belongs. Formerly it was supposed to be even older than the pyramids, but most modern authorities now ascribe it to a much later date. It is carved out of a rock which jutted above the plain, and stands about 66 feet high. It is the mightiest of the many examples of similar form, partly human and partly animal, which, connected in some way with the religious rites of the people, were executed at all periods of Egyptian art.

The First Theban Empire.

Between the work of the early pyramid builders and that of the kings of the first Theban empire considerable difference exists, which is only natural considering the centuries which had elapsed. Some of the tombs of this period were pyramidical and two storeys in height. The lower storey, which had almost straight sides, according to Mariette,[1] contained the mummy chamber, and above it was the pyramid proper, which was hollow, the sides being formed somewhat in the same manner as the later "bee-hive" tombs of Mycenæ (see page 54). These tombs were not of stone, like the Memphite examples, but of crude brick, and consequently have almost all disappeared.

[1] "Voyage dans la haute Egypte."

Beni-Hasan tombs.

Far more interesting than these, and very different in all respects, are the well-known "Grotto" tombs at Beni-Hasan, which date from about 2400 B.C. These are excavated in the steep sides of the hills on the east side of the Nile, overlooking the valley. The fronts are open and resemble a series of porticoes, as portions of the rock are left standing and form columns which support the weight above. The tombs in some cases consist of only one chamber, in others of two or three. The roofs of the inner chambers are often supported by columns carved out of the rock like those of the outer porticoes, but generally different in design. These roofs or ceilings are in many cases not flat, but curved in segmental form. This is not absolute proof that the arch and vault were known at this early period, but the supposition may fairly be advanced that if such had not been the case, these roofs would hardly have taken this shape.[1] The walls of the chambers are frequently decorated with sculpture and painting of a high order. These decorations are interesting in themselves, and also show that the religion of the people, notwithstanding that many centuries had passed, remained much the same as during the early dynasties, the dead still exacting the same respect and requiring the same attention as before.

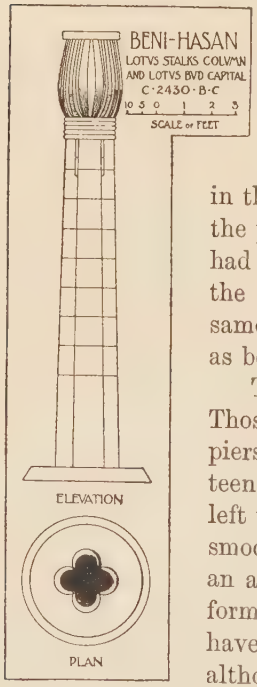


FIG. 5.

Columns.

Two kinds of columns occur at Beni-Hasan. Those at the entrances to the tombs are really piers, roughly worked so as to be eight or sixteen sided, except at the top, where a square is left which forms a simple capital, flush with the smooth portion of the rock above which acts as an architrave. The reasons for the multangular form are obvious. Cylindrical columns would have been difficult to work in the rock, and although square piers would have been easier, their appearance would have been clumsy, and they would have obstructed the passage way and the light unnecessarily. The octagonal form is practically as

[1] M. Choisy says that the form was copied from timber ceilings consisting of logs laid longitudinally side by side on a curve. The logs consequently rested somewhat on one another, and so the ceiling was stronger than if they had been laid flat.

Fig. 6.—Tombs at Beni-Hasan.

Fig. 7.—The Great Pylons at Karnak.

[*To face p.* 8.

strong as the square, does not offer the same obstruction, and could easily be arrived at from a square by chipping off the angles. These rock-cut piers were called by Champollion and other early writers "Proto-Doric" columns. They thought they saw in them the origin of the columns which afterwards played so important a part in Greek architecture. But this is unlikely. This form, it is true, is occasionally met with in the temples of the second Theban empire, but it was almost entirely discarded by Rameses the Great and his immediate successors. Under the Ptolemaic rule multangular columns were sometimes used, as at Kalabché, mentioned later (see Fig. 19), but these were more probably due to Greek influence on Egyptian art than to any inspiration drawn from the early examples at Beni-Hasan. It is hardly conceivable that the Greek architects, if they wished to copy directly Egyptian architecture, would have passed over the later and much finer work in the great temples, and harked back to a primitive form which had become obsolete.

Lotus columns.

Columns of the other kind are chiefly found supporting the roofs of the inner chambers. These resemble bundles of lotus stalks tied together at the top, immediately under the buds which form the lower part of the capitals. The upper part of the capitals consists of a plain square block, as in the multangular piers (Fig. 5).

Other tombs, similar to those at Beni-Hasan, are at Siout, which is also situated between Memphis and Abydos. The tombs are the only examples of any importance of the first Theban empire which exist; the few remains of temples which may belong to this period are very scanty.

The Second Theban Kingdom.

Far more wonderful even than the pyramids and tombs of Memphis are the Temples of Thebes. The former are interesting in an archæological and historical sense alone; but the Theban temples have the advantage of being architecturally beautiful as well. The "hundred-pyloned city of Thebes," as it has been called, at the period of the Ramesidæ must have presented a blaze of architectural splendour, which in scale and magnificence has had no parallel. Not even Babylon at its zenith can have excelled it. All the kings of the nineteenth dynasty were great builders, especially Rameses II. (B.C. 1333), known as Rameses the Great. He finished the Hypostyle Hall of the great temple at Karnak,

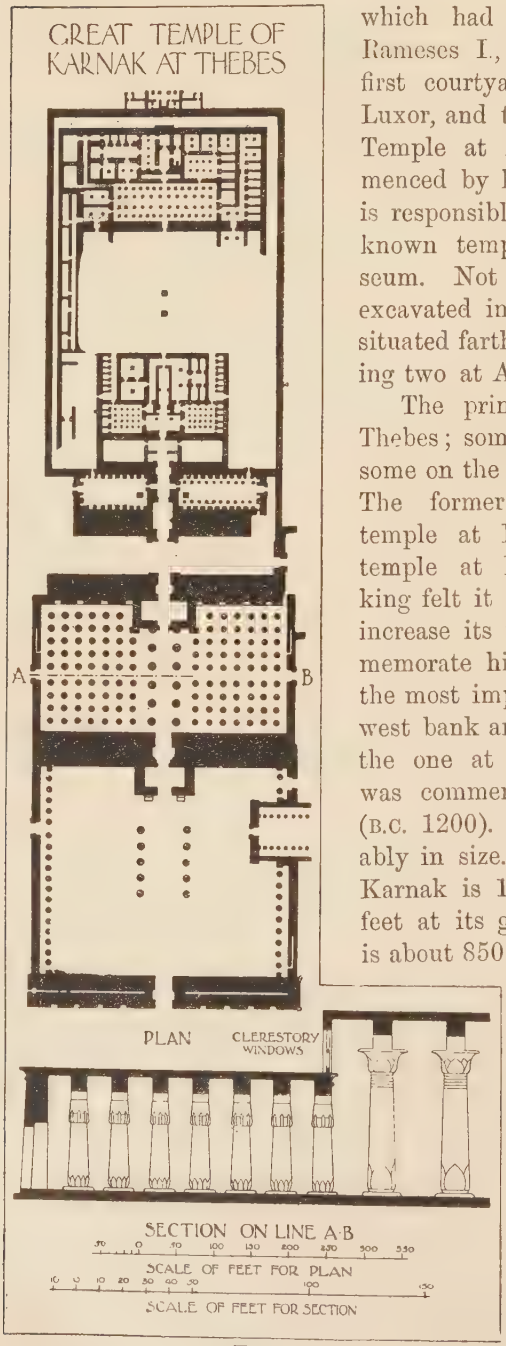


FIG. 8.

Principal temples.

which had been commenced by Rameses I., built the pylons and first courtyard of the Temple of Luxor, and the greater part of the Temple at Abydos, a work commenced by his father, Seti I.; and is responsible entirely for the well-known temple called the Ramesseum. Not content with this, he excavated in the rock six temples situated farther up the Nile, including two at Abou-Simbel.

The principal temples are at Thebes; some are on the east and some on the west bank of the Nile. The former group includes the temple at Luxor, and the great temple at Karnak, which every king felt it his duty to add to, to increase its magnificence and commemorate his own existence; and the most important temples on the west bank are the Ramesseum, and the one at Medinet-Abou, which was commenced by Rameses III. (B.C. 1200). These vary considerably in size. The great temple at Karnak is 1215 feet long by 376 feet at its greatest width; Luxor is about 850 feet long; the Ramesseum is 590 feet by about 180; and the Medinet-Abou temple is about 500 by 160. It must be remembered, however, in judging of these sizes, that only a portion of the space is covered over, the rest is open courtyard.

Plans.

The leading idea of the plans of the temples built by the Theban kings is the same in each. Courtyards, lined in most cases by colonnades, are succeeded by a labyrinth of dark chambers which surround the sanctuary. The principal entrance is by a lofty doorway—that of the temple of Luxor is 56 feet high—which stands between two immense masses of solid, or almost solid, masonry, called pylons. The doorway leads into the first courtyard, beyond which, separated from it by another pair of pylons, is generally another courtyard, very little smaller than the first. Opening out of this is the hypostyle hall, a vast chamber, the flat roof of which is carried by many columns. Sometimes there is only one courtyard. Beyond the hall comes the sanctuary, into which only the priests and kings were admitted, surrounded by many dark chambers, the uses for which are not definitely known; some were probably for purposes of ritual, and others held the vessels and paraphernalia required on days of high festival. In this Egyptian plan are found two features afterwards common in the architecture of later periods. One is the entrance courtyard which played such an important part in Roman and Romanesque architecture; the other the internal division into a lofty central nave and lower side aisles, so distinctive of the ecclesiastical architecture of the Middle Ages. Surrounding each temple is a high wall, which conceals entirely the glory of the interior. Sometimes round the sanctuary end are double walls, with a passage in between, as in the great temple at Karnak.

Hypostyle hall.

The finest of all the hypostyle halls is that of Karnak. It contains 134 columns, of which the ten central ones are far larger than the others; covers an area 340 feet wide and 170 feet long—the proportion of width to length is therefore exactly two to one—and is 76 feet high in the centre, the sides being some feet lower. These dimensions exceed those of most English cathedrals, and it must be remembered that they apply only to a small portion of the temple, and do not include the sanctuary and chambers beyond. The halls really correspond to the naves, or western portions of the cathedrals, and should therefore be compared with those only.

Pylons.

The pylons, in their size and massiveness, bear a closer resemblance to the pyramids of the early dynasties than any other part of the temples. They do not cover so much ground, and their height is less, but their dimensions are nevertheless stupendous.

The largest are those which form the entrance to the great temple at Karnak. Including the central doorway, they measure 376 feet in width, are 50 feet thick at the base, and 146 feet high. Scale was given to these great masses by obelisks and colossal figures, which were placed in front of them, the slender proportions of the former being especially valuable for this purpose.

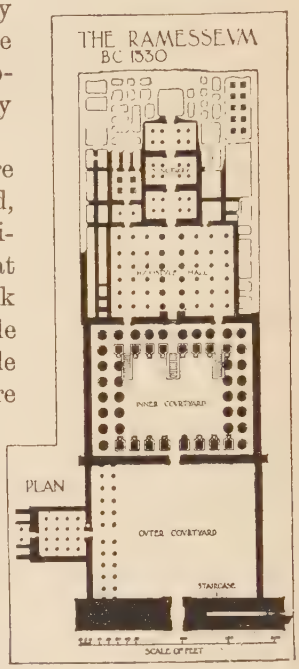


FIG. 9.

Approaches to temples.

The approaches to the temples were worthy of the buildings to which they led, and were arranged on an equally magnificent scale. Between the temple at Luxor and the great temple at Karnak ran a paved causeway about a mile and a quarter long, lined on each side by carved sphinxes, of which there are said to have been a thousand altogether. Other temples had similar avenues.

Rock-cut temples.

The famous rock-cut temples in Nubia belong to the same period as the Theban temples, and the plan of the chambers hewn in the side of the mountain agrees with that adopted in the temples erected on the plains. There is the same succession of vestibule halls, sanctuaries, etc., and in front of the entrances were often colonnaded courtyards and avenues of sphinxes, similar to those at Karnak. The best-known example is at Abou-Simbel (Ipsamboul), and was excavated by order of Rameses II. This is chiefly remarkable for the four colossal seated figures of Rameses himself, cut in the face of the rock, each about 65 feet high, which guard the entrance, two on each side.

The Ramesseum.

The plan of the Ramesseum appears to be the most normal of Theban temples, and although a distinction is drawn by some writers between this temple and others on the west bank, and the big temples on the east bank, this does not affect the plan.[1]

[1] The distinction, which is made by Mariette, and accepted by Perrot and Chipiez, is that the latter temples were dedicated to the great national gods, and the former were primarily intended for the worship of the king who built them, although ceremonies in honour of the national deities were also performed in them.

Beyond the entrance pylons is the first courtyard, lined on two of its sides by a double colonnade, which contained the colossal seated figure of Rameses II., the founder of the temple, now broken to pieces. The second court is nearly as large as the first, and is chiefly remarkable for the colossal figures, representing the goddess Osiris, which are carved on the fronts of the square piers at the end. A few steps lead to a vestibule, beyond which is the hypostyle hall (136 feet by 103), with forty-eight columns in eight rows supporting the flat roofs; the twelve central columns being, as usual, larger than the side ones. The roofs of the sanctuary and of many of the surrounding chambers are also supported by columns. The temple of Medinet-Abou, which is rather more than half a mile away, has a similar plan and is of like dimensions.

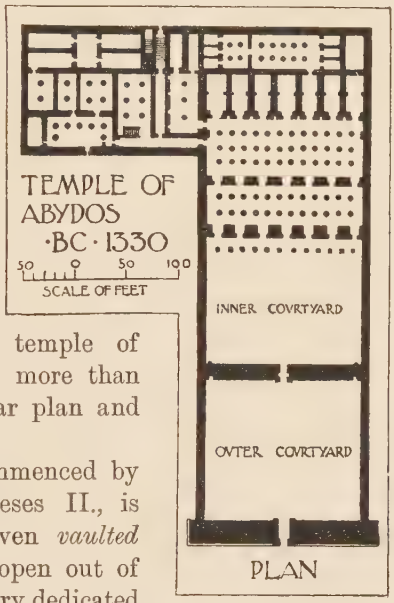


FIG. 10.
Perrot and Chipiez (Chapman and Hall).

Temple at Abydos.

The temple at Abydos, commenced by Seti I. and finished by Rameses II., is chiefly remarkable for the seven *vaulted* chambers, side by side, which open out of the inner hall. Each is a sanctuary dedicated to a special deity, the seventh deity being King Seti I. himself, who thus takes his place along with "the great Egyptian gods, Horus, Isis, Osiris, Amen, Harmachis, and Ptah." This is merely one proof out of many which might be instanced to show that the king, when dead, was regarded as an immortal and worshipped accordingly.[1]

Lighting of temples.

The feeling of awe which the succession of large halls, with their massive columns and surrounding chambers, must have inspired was doubtless greatly increased by the dim light which pervaded all the covered portions of the temples, and which formed a great contrast after the glare of the entrance courtyards. The walls were windowless. Some of the chambers were

[1] "In the temple of Gournah (at Thebes) we find Rameses I. seated in a naos, and receiving the homage of his grandson, Rameses II.; and, again, the latter worshipping Amen-Ra, Khons, and Rameses I. at one and the same time" (Perrot and Chipiez, "A History of Art in Ancient Egypt" (translated), vol. i. p. 269).

VIEW ACROSS HYPOSTYLE HALL AT KARNAK SHOWING THE CLERESTORY WINDOWS OVER SIDE PORTIONS LIGHTING THE CENTRAL PORTION OF HALL

Fig. 11.

absolutely dark, except for artificial light, and others were very imperfectly illumined by very small holes cut in the flat stone roofs. In the hypostyle halls alone was any special arrangement made for admitting light, and even then the amount obtained was far from being excessive. This was derived from "clerestory" openings at the sides, ingeniously fitted in between the high roof over the central portion and the lower side roofs. In the hall of the great temple at Karnak, these openings are filled with vertical slabs of stone, each about 16 feet high and 14 inches thick, pierced with long slits about 6 feet long by 10 inches wide. They are really huge gratings, and the streaks of light falling through them into the temple below must have produced admirable effects. (See also Fig. 8.) In the Ramesseum there are similar, but much smaller, openings, which may have been filled originally in the same manner.

Rock-cut tombs.

The Theban kings built no pyramids, as the rulers of Memphis did; their burial-places are all situated in the mountains to the west of Thebes, the sides of which are honeycombed to provide resting-places for kings, priests, warriors, and high officials. The separation of the tomb from the temple seems at first sight to suggest a change in religious ritual, as in the early Memphite days they were always close together, but this does not necessarily follow. The Pharaohs might see the advantage of having their tombs at a distance, in more or less inaccessible regions, but they naturally preferred their temples to be near at hand. Distance would not affect their devotions, and prayers would be as efficacious for the dead buried many miles away as they would be for those interred a few yards off.

The walls of the tombs, as in those of the people of the Memphite dynasties, are profusely decorated with carvings and vivid paintings. It is somewhat difficult to believe, as stated by some writers, that these were never intended to be seen, but it is quite possible such was the case, as each king excavated his tomb during his own lifetime, and might be supposed to derive a certain satisfaction from feeling that after his death his surroundings would be as beautiful as the hand of man could make them. The decorations were for his benefit, not for his successors'. Certain it is that the entrances were carefully hidden, and it is recorded by Belzoni, who discovered the tomb of Seti I., that, in that tomb at least, elaborate precautions had been taken to conceal the immediate approach to the chamber in which the sarcophagus was placed. Some of

the tombs are of very great extent; the largest are those of Seti I. and Rameses III., each of which is over 400 feet in length. To obtain some idea of the enormous amount of labour which this entailed, and of the difficulties under which the work was carried out, it should be remembered that the chambers, and the long corridors leading to them, had to be excavated in the solid rock, and the walls and ceilings afterwards decorated by such slight aid as torches and lamps would provide.[1]

Later Egyptian work.

It is a matter for great regret that the buildings erected by Psammetichus (B.C. 666) and by Amasis (B.C. 570) have been so completely destroyed, because, owing to the fact that these kings especially encouraged Greek settlers, a very interesting

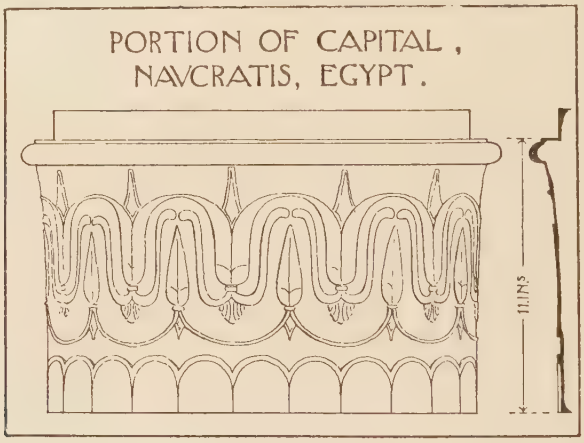


FIG. 12.

light might otherwise have been thrown on the beginnings of Greek architecture. The Greeks more likely got ideas from Naucratis, and other cities of the Delta, than from Beni-Hasan, Memphis, or even from Thebes. The former towns were nearer to the coast than either of the ancient capitals, were at that time of greater importance, and, according to Herodotus, were adorned with many fine buildings. Their architecture may, like the later Ptolemaic work, have been merely a copy of the Theban, but, on the other hand, it may have contained some new germs which, carried into Greece, helped to form the style

[1] The roofs of many of these chambers are supported by columns, and are arched like the inner chambers of the Beni-Hasan tombs.

afterwards there brought to perfection. A portion of a capital in the British Museum, said to be from the temple of Apollo at Naucratis, suggests a lighter and more refined treatment than is usual in Egyptian work, but there is no means of fixing its date. It may have been carved during the Ptolemaic period, in which case, so far from being a prototype of Greek art, it becomes merely a reflection of it.

The Ptolemaic and Roman Periods.

The Greeks, when they conquered Egypt, accepted the vernacular style, so far as the temples are concerned, and attempted no alterations except in matters of detail. This is not to be wondered at. The Ptolemys had quite enough to do to govern the people without forcing them to change methods of building which had existed for nearly a thousand years, and which were suited to the climate and religion. To have imported workmen to supersede the natives would have been a big undertaking; besides, it must be remembered that Greek architecture, at the end of the fourth century B.C., no longer possessed that strong vitality which distinguished it a century before. In secular buildings the changes were probably very much greater, especially in Alexandria, and in the other new cities which sprang up near the coast. In them the Greek architect found employment, and doubtless brought with him the style of his own country, which he was able to employ with but slight modifications. The remains of the secular work of this period, however, are so scanty, that it is impossible to define absolutely its character.

Three hundred years later, the Romans followed the lead of the Greeks. This was still more natural. The Romans were ever ready to adapt the architecture of other nations, and, when they succeeded as rulers of Egypt, they can hardly be said to have had an original style of their own to force on the conquered. So the Egyptian traditions of art lingered long after Egypt had ceased to belong to the Egyptians. The differences between the work of a Rameses and the work of a Cæsar are slight, and if it were not for the royal cartouches carved by the Egyptian kings on all the buildings they erected, credit might, in many instances, be rendered to Cæsar for things which are not Cæsar's, and to

Rameses for those which are not Rameses'.[1] During these periods Thebes was no longer the great centre it had been under the second empire, and temples were built in all parts of Egypt, and up the Nile as far as the island of Philæ. The principal Ptolemaic temples are at Edfou (B.C. 237—B.C. 57) and Dendereh (*c.* B.C. 200); the charming group at Philæ is also chiefly Ptolemaic, although added to in later times. The temple at Esneh is one of the best known of the Roman examples. Besides the above, additions were made to existing temples at Karnak and elsewhere, in all cases the old style being faithfully followed.

Temple plans.

The differences between the plans of the temples of these periods and those of the earlier ones are very slight. There are the same entrance pylons, colonnaded courts, inner sanctuaries, and enclosing external walls. The principal difference is the partially open portico on the side of the courtyard facing the entrance which takes the place of the hypostyle hall. The spaces between the columns in front, except in the centre where the doorway comes, are filled in with a low screen wall, about half the height of the columns. The openings above the wall gave ample light, and consequently the elaborate arrangement of clerestory windows found in the hypostyle halls of the earlier temples was not necessary. The doorways are very curious. The lintel does not reach across from jamb to jamb, but merely extends a few inches on each side, and the moulding over it is returned. A beam across the opening would have interfered with the free passage of processional banners and effigies on days of high festival, and this, it is stated, is the reason for this peculiar and unique arrangement. Be that as it may, these broken lintels occur in nearly all Ptolemaic temples, at Edfou, Dendereh, Philæ, and elsewhere.

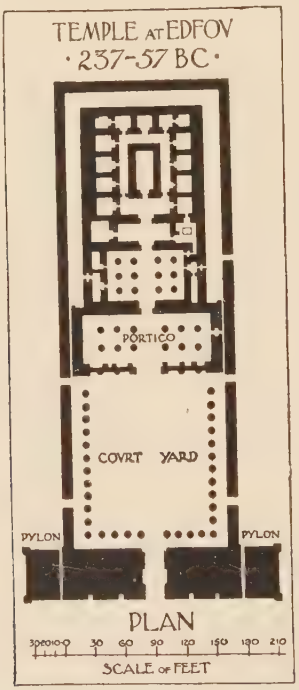


FIG. 13.
Mariette (Welter).

[1] The cartouche, however, is not always a reliable guide, as kings sometimes set their seal on the work of their predecessors.

In the temple at Edfou the columned hall behind the entrance portico is lighted by a large square opening in the roof. This hypæthron, or top light, is rarely found in Egyptian temples, and

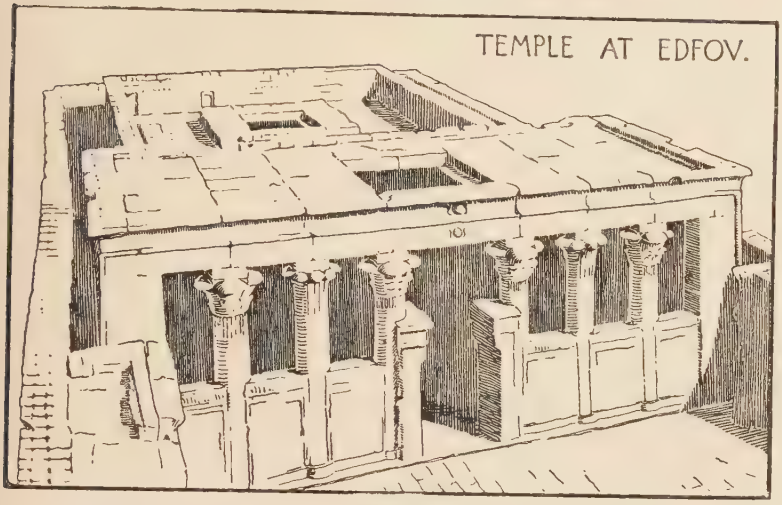


Fig. 14.

in this instance is undoubtedly due to Greek influence, as this method of lighting was a favourite with the Greeks.

Small buildings.

To the Ptolemaic period belong, in most instances, the small buildings surrounded by external columns which are found in different parts of Egypt. Some doubtless are older; thus the example at Elephantine is attributed to Amenophis III., who reigned before Rameses. This little temple—for such it is supposed to have been—is raised on a high plinth with square piers at the sides and columns at each end, and so may be regarded as an early example of the peripteral—*i.e.* colonnaded—treatment which was afterwards so important a feature in Greek architecture. It does not follow, however, that the Greeks took their idea of the peristyle from Egypt, any more than they took the idea of the lintel from there. Posts and beams play so important a part in the buildings of all ages, that no single country can claim to have invented so obvious a method of construction. A somewhat similar building, known as "Pharaoh's bed" at Philæ (Fig. 16), consists of columns connected by low screen walls, like those of the porticoes of the larger temples, the whole being covered by a flat stone roof. This building undoubtedly was not a temple, but merely a porch at the river-side, from which people

could embark, and where illustrious visitors could be received. The doorway at each end has a broken lintel.

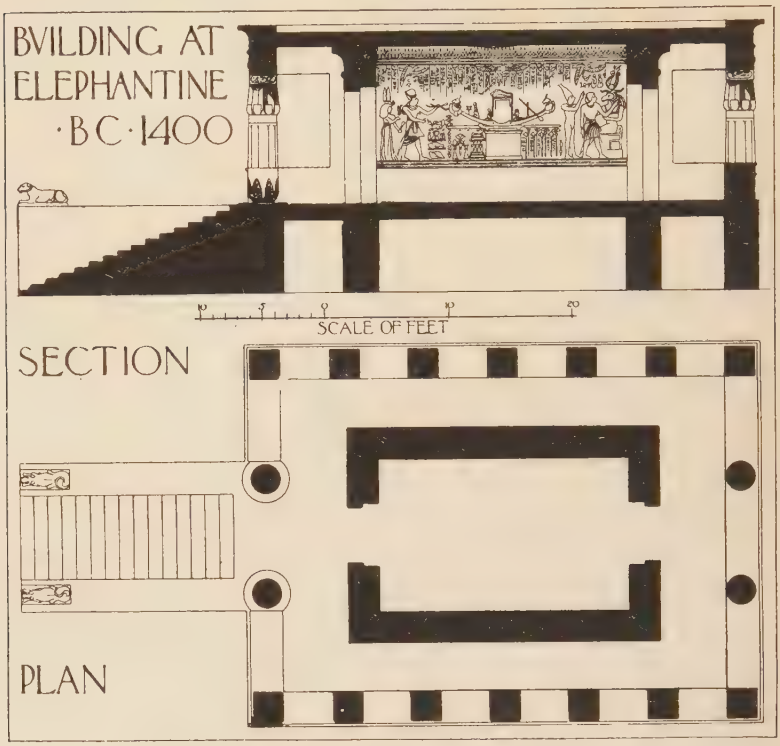


FIG. 15.
Prisse d'Avennes (Bertrand).

Domestic work.

Little is known regarding the domestic work of ancient Egypt, and that little is derived chiefly from sculptured representations. Much of it, doubtless, was executed in perishable materials, such as crude bricks and wood, and consequently has long since disappeared; but a good deal probably remains still buried, and may one day be brought to light. It is hardly likely that a race of monarchs which erected such magnificent temples and tombs can have been content with palaces inferior to those of other countries. A king of Egypt must have been as nobly housed as a king of Assyria; but little is left to proclaim the magnificence of the Egyptian palaces, except a small pavilion of Rameses III. at Medinet-Abou, which, although distinguished by great refinement and delicacy of detail, can hardly be taken as a guide to

Photo: Bonfils.

FIG. 16.—"PHARAOH'S BED" AT PHILÆ.

[*To face p.* 20.

their appearance. In this little building are several well-designed windows of good proportion, which show how successfully the Egyptian architect treated these features.

Materials and Workmanship.

Materials. The materials used by the Egyptians were limestone, sandstone, granite, alabaster, and brick. Wood was scarce, and could not be obtained in large scantlings; hence it was rarely, if ever, used in the temples, although no doubt it was largely employed in domestic buildings. Stone came from Cairo and Upper Egypt, and granite was procured from Syene, now Assouan. The former was the principal material for the walls, columns, roofs, floors, and other structural parts of the temples; and the latter was chiefly used for thresholds, lintels, and bases of columns. The statues, obelisks, and sarcophagi are also generally of granite, and a few rooms in the great temple at Karnak are faced with it. Alabaster was only used for decorative purposes.

Bricks were sometimes kiln-burnt, but generally they were merely sun-dried. The latter would be useless in a wet climate, but in Egypt rain rarely falls, except near the coast, and they could consequently be used with impunity. The size of the bricks varied considerably during the different periods. The oldest are the largest. Those of the twenty-first dynasty (*c.* B.C. 1000), according to Professor Flinders Petrie were $18 \times 9 \times 5$; afterwards they gradually became smaller.

Workmanship. Both brick and stone walls in Theban and later work are built with a marked inward slope or "batter," which possibly may have been suggested by the pyramids and mastăbas of the old Memphite kingdom. The cores of stone walls are rubble, the outside facings alone being of worked stone. Mortar, consisting of clay, mixed sometimes with a little sand or straw, was used occasionally, but more often dowels of metal or of sycamore wood were employed to keep the stones in position. The love of the Egyptians for carving everything they could lay hands on led them often to carve the wood dowels, although the work on them could never be seen. The carelessness in jointing noticeable in much of the masonry is accounted for by the fact that walls, externally as well as internally, were generally covered with stucco. The stucco afforded a better surface for painting on than the natural face of either granite or stone, and in outside work

formed a preservative which, when the wall was of brick, was almost a necessity. In building their stone walls, the Egyptians often built first in the rough, and afterwards carved any mouldings or panels which were required out of the built-up stones. A portion of "Pharaoh's bed" at Philæ which is left unfinished illustrates this. The stones are not, as a rule, much larger than are used now, except on the pyramids. The architects of the Theban empire did not hesitate, when necessary, to quarry huge blocks of granite and stone for their obelisks and statues, and some of the lintels in the temples are 25 to 30 feet long; but for ordinary walling, they knew better than to add to the difficulties of hoisting by the employment of unnecessarily large material.

Raising of material.

How the great pyramids and the pylons of the temples were reared has for years been a matter of much discussion. Scaffolding was in most cases out of the question owing to the scarcity of timber. One theory is that inclined planes of sand, faced on top with brick, were formed against the growing building, and up these the great stones were dragged and placed in position. As the pyramid or pylon grew higher and higher, so did the approach. When the work was finished the approach was cleared away. The objections to this theory are that in a big erection the plane would stretch to an inconvenient distance, and that as its surface would have to be smooth to allow the stones to move easily, little foothold would be afforded to the labourers. A more satisfactory suggestion is that instead of planes stepped masses of brick and earth were employed, which formed temporary staircases. Remains of mounds, which for some reason or another have not been cleared away, against two of the great pylons at Karnak support this theory. It is calculated that each step was about 5 feet wide and the same in height, and that smaller and more numerous steps were provided at intervals for the workers to mount and descend by.

The "rocker."

For raising the blocks from one great step to another the Egyptians employed a simple machine which may be termed a "rocker."[1] A stone was placed on the rocker, a lever was inserted under the central cross-bar, which is higher than the

[1] Some of these rockers are now in museums, and until recently were regarded as centres for arches. One, in Professor Petrie's Museum at University College, London, came from the foundation deposit of models under the Temple of Hatshepsut at Deir el Bahri, 1500 B.C. How they were employed is thoroughly worked out in M. Choisy's "L'art de bâtir chez les Egyptiens."

others, and one end was raised by levering down the other. Under the raised end was inserted a block. A reverse movement brought the rocker on top of the block, and at the same time allowed another block to be put under the opposite end. By this means the stone rose. The operation took place lengthways on each of the steps in turn; when the rocker had reached the required height it was turned round at right angles, and the stone was slid or pulled on to the next step; and so on. There is nothing particularly scientific about this method, but it is a remarkably ingenious one.

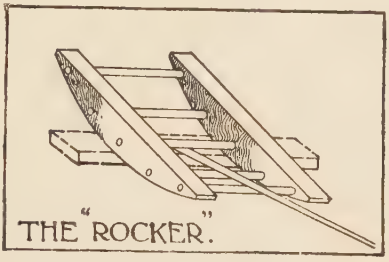


FIG. 17.

When the wall was of brick the temporary staircase was not required, as the ends were not built up like the rest, but the courses were racked back so as to form in themselves staircases by which the workmen could mount. To complete the ends bricks were stacked on top of the wall, and the bricklayers, working from above, built up the angles.

Transport.

The transport of the huge obelisks and enormous carved figures is a matter for wonderment, but where water carriage was available —and most of the temples are on or near the Nile—this should have presented no great difficulties. They were doubtless floated between rafts and piloted up or down the river. When carriage was by land, they were dragged across by sheer force of numbers. An ancient inscription records that one monolith required three thousand men for its transport. The mere moving of a vast mass is not so difficult after all, provided the ground is level. Once get it placed on its sledge and fairly started, by the aid of well-greased rollers and relays of labourers progress is easy. The difficulty lies in the start, and in dealing with inclines. For small stones the rocker came in useful; for large ones, many and strong levers were required. At the commencement of the journey the end of the block was levered above the earth, the ground filled up underneath it, and an inclined plane formed to give the stone a start. Once started it probably never stopped, night or day, except when obstacles came in the way. When an incline had to be negotiated, the

method adopted at the start was repeated several times, the stone each time being raised to a height sufficient to provide a slight slope down which it could slide. Such methods may be slow, and would of course be impossible except where labour was cheap and abundant and time of no great object; but under the conditions then prevailing they sufficed. The achievements of the Egyptians are sufficiently remarkable without attributing to them a knowledge of advanced mechanical principles which the inscriptions, and the slabs carved with such vivid representations of their everyday life and habits, do not support; in fact they are all the more remarkable when one considers how few and primitive were their appliances.

Lintel and arch

The architecture of the Egyptians in the main is lintel and post construction. Lintels span the spaces between the columns, and the flat roofs are always formed of long stone beams. But the arch and vault were used as well from a very early period. Putting on one side the rough discharging arch over the King's chamber in the Great Pyramid as no proof, other examples exist, some quite as old, of arches constructed in different ways. Professor Flinders Petrie describes a vault at Dendereh composed of three rings of crude brick of the fourth or fifth dynasty (*c.* B.C. 3600) and two arches at Rahotep of about the same date. Mariette says he found a semicircular arch at Abydos of the sixth dynasty with brick voussoirs and a limestone keystone, the mortar joints being galetted, *i.e.* small stones bedded in them. Mention has already been made of the vaults in Seti's temple at the same place, and behind the Ramesseum are other vaults. A semicircular arch formed of nine rings of brickwork in a wall surrounding the tombs in the valley of El-assanif, near Thebes, dates from about 700 B.C. All forms of arches are to be found, semicircular, pointed, segmental, but the favourite was the elliptical.[1] Some of the last are built with voussoirs, as arches are at the present day, but the Egyptians preferred an extremely ingenious method which the tile-like shape of their bricks,[2] and their desire to dispense with timber centering rendered more suitable. When they employed this method they built the bottom courses with horizontal beds as high as the factor of stability permitted, thus forming a haunch which diminished the span and at the same time offered resistance

[1] Inverted arches even were used, as in the present day, to strengthen foundations.

[2] The bricks of the Ramesseum vaults are $14 \times 7 \times 2\frac{1}{3}$ inches thick.

to the thrust of the vault. Above this point they laid the bricks edgewise, not voussoir fashion. Their procedure was as follows: They first traced on a wall at the extreme end the outline of the vault, then they built the haunches the entire length. Next they built a ring of bricks *flat* against the end wall forming the first slice of the vault. Against this slice they laid another, and so on; the different slices being kept in position by the adhesive power of the mortar. The vault could be two or more rings thick, and sometimes, as in the Ramesseum, extra rings are placed at intervals above the others, to stiffen the vault. Sometimes they "skew-backed" the face of the end wall, so that all the slices slope backwards instead of being vertical, thus giving greater strength. In addition, the Egyptians sometimes built arches with horizontal beds throughout. The vaults of the seven chambers in the temple at Abydos are constructed in this way. The advantage of the "corbel" arch is, that it is more stable than the true arch, since it has no lateral thrust; but it is not suitable for wide spans, especially if the semicircular or elliptical form is used. For this reason it is generally found in conjunction with the pointed form.

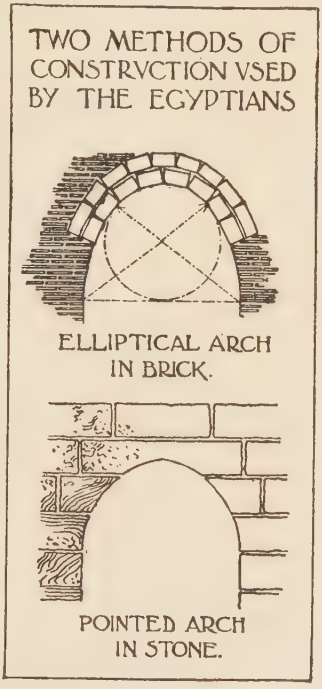


Fig. 18.

Egyptian columns are not, as a rule, monolithic. Their great size in most cases rendered this impossible. A few of the smaller ones of the Theban Empire are in single stones, and later, under Roman influence, the practice of using monoliths became more general, but the great columns of Karnak and Luxor are built up in courses, each course containing two or more stones; and their capitals are in many pieces. Some of these columns are as high as the interior of many an English Cathedral. The central columns at Karnak are 65 feet high, the side ones 43 feet. The average proportion of height to diameter is 5 or 6 to 1; in this respect, there is consequently little

Columns.

difference between them and columns of the Greek Doric order. The earliest columns are the rock-hewn ones at Beni-Hasan which have already been described. The columns of the great Theban period are mostly cylindrical, although they are sometimes multangular, and at other times are "scolloped." They generally rest on circular bases, and diminish in diameter towards the top, as was usual in the columns of all architectural styles, except the Gothic. Very often they are rounded off at the bottom, immediately above the base; but when this is done to any considerable extent the result is unsatisfactory. The shafts, bases, and capitals are sometimes left plain, but they are more often profusely carved and gorgeously coloured.

Capitals. Practically no difference exists between early and late columns except in the design of the capitals. The massive proportions remain much the same. In the great period of the second Theban empire, the two favourite forms of capital were those known as the lotus-bud, and lotus-flower, or bell shape. These forms, however, were invented before this period, as both appear carved on bas-reliefs of the time of the pyramids. The lotus-flower capital was used chiefly for the large columns lining the central aisles of the great hypostyle halls, and the lotus-bud capital is generally found on the smaller columns at the sides, and was also the favourite for courtyards. Not only did the lotus-flower suggest the two forms, but realistic representations of it are also frequently carved on the capitals and on other parts of the columns.[1]

When the lotus-bud capital is used, the beam over it rests on the square block, or abacus, which forms the top member of the capital, an arrangement which is perfectly logical and satisfactory. But with the bell-shaped capital, instead of the beam resting on the top of the capital, the outward curve of which seems specially designed to receive it, a square block of stone is inserted in between. In the work of the time of Rameses, this block is of no great height, and consequently is not objectionable, but in the later Ptolemaic period it often comes absurdly high, as in the little "Pharaoh's bed" at Philæ. It is possible that the Egyptian architects introduced the block so that nothing should interfere with the beautiful top curve of the capital; if so, they may be forgiven for the intrusion of an otherwise unnecessary feature.

[1] The flower of the Egyptian lotus plant did not float on the surface of the water, but rose above it on a stiff stem, 12 to 15 inches high. This is well illustrated in the carvings.

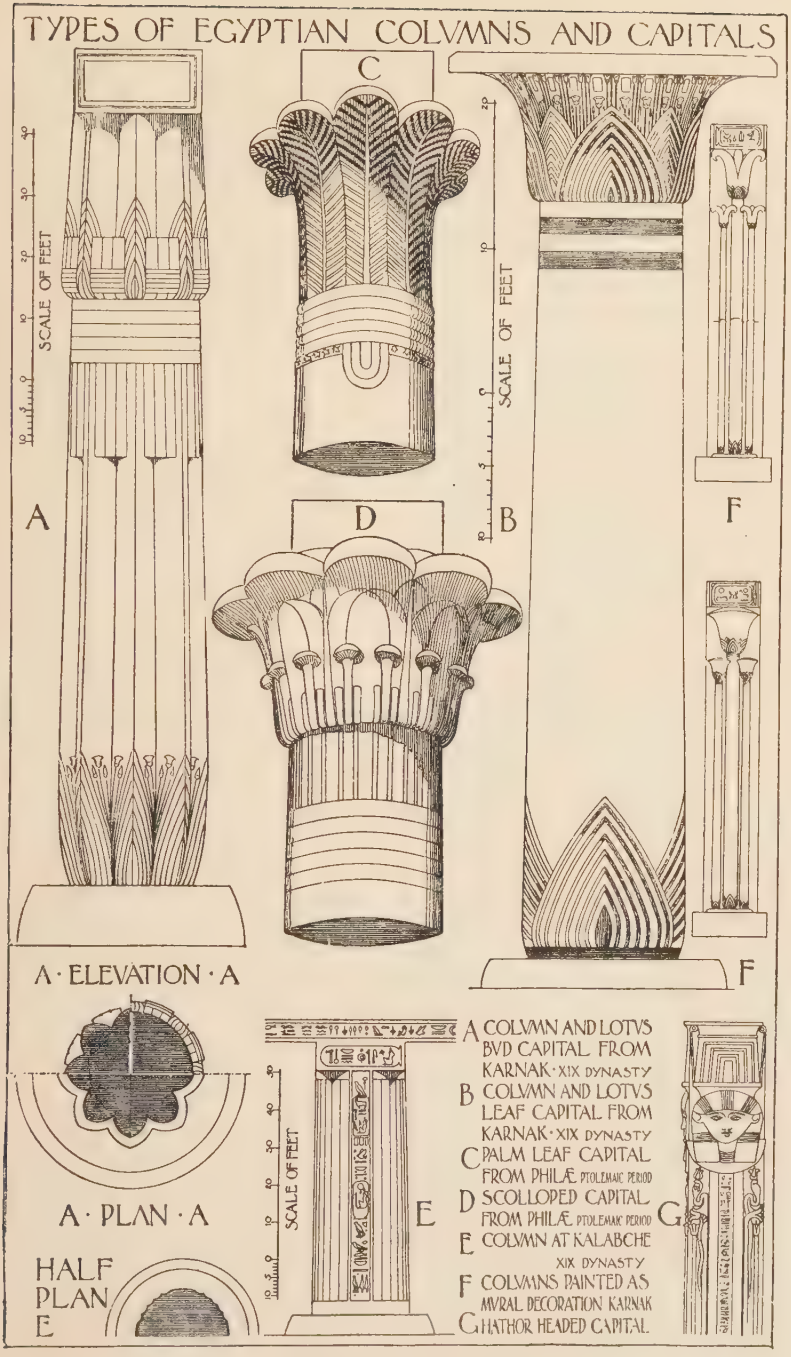

TYPES OF EGYPTIAN COLVMNS AND CAPITALS
SCALE OF FEET
A
C
D
B
F
A · ELEVATION · A
A · PLAN · A
HALF PLAN E
A COLVMN AND LOTVS BVD CAPITAL FROM KARNAK · XIX DYNASTY
B COLVMN AND LOTVS LEAF CAPITAL FROM KARNAK · XIX DYNASTY
C PALM LEAF CAPITAL FROM PHILÆ PTOLEMAIC PERIOD
D SCOLLOPED CAPITAL FROM PHILÆ PTOLEMAIC PERIOD
E COLVMN AT KALABCHE XIX DYNASTY
F COLVMNS PAINTED AS MVRAL DECORATION KARNAK
G HATHOR HEADED CAPITAL

FIG. 19.

Lepsius & Prisse d'Avennes.

In the Ptolemaic and Roman periods the lotus-flower capital underwent some modifications. The top member is often "scolloped," so as to be four or more sided, and the bell below is carved with palm-leaves, as at Esneh, or with lotus and other leaves, and little volutes, as at Philæ. These slight modifications in detail are almost the only differences permitted by the Egyptians in their national style after they became subject to foreign rulers, but even these are not always reliable proofs as to whether work is early or late in date, as the scolloped capital is sometimes met with in temples built before Rameses. A form of capital which, however, is distinctive of Ptolemaic and Roman times consists of a square block, on each of the four sides of which is carved the head of Hathor, one of the Egyptian goddesses. Some excellent examples occur in the portico of the temple at Dendereh.

Other columns.

Multangular columns, like those supporting the roofs at Beni-Hasan, were not much used after the first Theban period, and it is therefore extremely improbable, as stated before, that they supplied the model for the fluted columns of the Greeks. There are some, however, at Karnak of later date, and at Kalabché are some interesting ones of the time of Rameses II. These are almost cylindrical, being twenty-four sided, but their peculiarity is that four vertical strips, carved with cartouches, divide each column into quarters. A modern architect wanting a "new" form of column might do worse than follow this old idea.

Sculpture.

The low-relief sculpture which covers the pylons, walls, and columns of the temples and tombs is most remarkable. In the Theban dynasties little attempt was made to obtain uniformity of scale; figures large and small are intermixed with smaller carved detail. In Ptolemaic and in later work, however, the surfaces are sometimes divided into panels of equal size, filled with carving, as on the entrance pylons of Karnak (see Fig. 7.) Two different processes for low-relief work were adopted. In the earlier, the background is cut away, leaving the modelled figures in relief, as on the tombs at Memphis and Sakkarah of the Memphite period. The most beautiful examples are probably those in Seti's temple at Abydos; the figure of the king being a very fine example of low-relief sculpture. In the later method, the face of the stone forms the ground, and the figures themselves are recessed and modelled

below this, their highest parts being flush with the ground. The sinking is very slight, seldom more than an inch and a half at the deepest point. This method is especially suitable for columns, as it does not destroy their outline to the same extent as the other, and for this reason it was employed on the columns of the hypostyle hall of the great temple at Karnak. Sometimes there is little or no modelling below the surface, and the contours of the figures are merely indicated by incised lines. Most of the work which covers the walls of the Ramesseum and the temple at Medinet-Abou is executed in this manner, which is a cheap and simple way of obtaining a certain amount of effect.

Hieroglyphics.

One most interesting feature in nearly all Egyptian buildings is the crowd of carved hieroglyphics which covers the whole surface of walls and columns, except where figures come. These hieroglyphics have a double value—an æsthetic and a historical. They produce a decorative effect, give scale to the building, and, in addition, afford much valuable information regarding names, dates, and incidents, which without their aid would never have been known.

Colossi.

Besides their low-relief sculpture, the Egyptians carved figures in high relief. Those on the piers in the Ramesseum and at Medinet-Abou, and the Colossi, cut in the rock at Abou-Simbel, may be mentioned as examples. Their detached figures, cut out of solid blocks of granite or limestone, which were transported many miles to their destination, are even more remarkable. The two seated figures of Amenophis III. (*c.* B.C. 1500) at Thebes, which are the only remains of the temple erected by him, are about 52 feet high, without their pedestals; and the seated figure of Rameses II. in the Ramesseum, now cast down and broken, was larger still The latter is of limestone, but most of the figures are of red granite from Syene.

Obelisks.

The obelisks are as wonderful as the colossi. Few remain in their original positions. Rome possesses some of the largest; one from Luxor is in Paris; and London has Cleopatra's needle, which, however, is comparatively small, being only 68 feet high.

Mouldings.

The mouldings used by the Egyptians were very few. The most characteristic is that known as the "gorge," which crowned the walls and pylons, and formed the cornice over doorways. In the latter position examples of it exist as early as 3500 B.C.; and it was considered the only appropriate finish to a wall long after the Roman conquest. Nothing shows more strongly the

conservative character of Egyptian architecture than the retention of this moulding through all these centuries. The angles of the pylons are generally finished with a roll which mitres with the lower member of the "gorge."

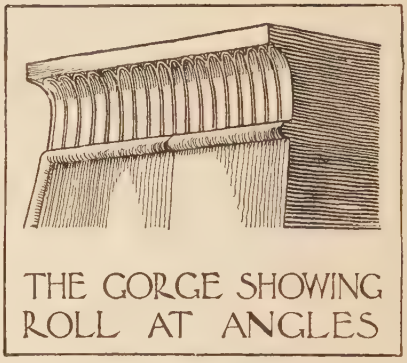


Fig. 20.

Decoration.

Most Egyptian work, whether carved or plain, was intended to be painted. A thin coat of stucco was first laid over the surface, as this took the pigments much better than the natural material. The uncarved external walls of the temples were covered with paintings, and the sculptured pylons were also coloured. The colours used were vivid green, blue, red, and yellow, which have now in most cases beautifully toned down. An elaborate colour scheme was necessary externally as the dazzling light would otherwise have destroyed the architectural features; and it was equally necessary in the dim interiors affected by the Egyptians, where sculpture, unless relieved by colour, would have been lost. The painted figures, like the carved ones, are of tall proportion, and are generally shown in profile. A full-face figure fronting the spectator is rare, although Champollion illustrates some from the Beni Hasan tombs. The paintings there are amongst the finest in existence; the later Theban dynasties did not improve on the work of their forefathers in this respect.

The designs for painted ornament are very numerous, and some exceedingly beautiful. Patterns composed of squares, lozenges, and zigzags are common (Fig. 21, B). The chess-board is a great favourite (E), and so are the fret and rosette (F), especially on ceilings and beams. A modification of the "guilloche" pattern (A), with the lines enclosing lotus flowers, is very effective; and the lotus flower is often used as a frieze, with buds and open flowers alternating and connected by stalks (D). This design was copied by the Assyrians, and also suggested the beautiful, so-called, "honeysuckle," or anthemion, pattern of the Greeks (see Fig. 62). The vulture with outspread wings is a favourite symbol, and was generally carved over doorways (see Fig. 1).

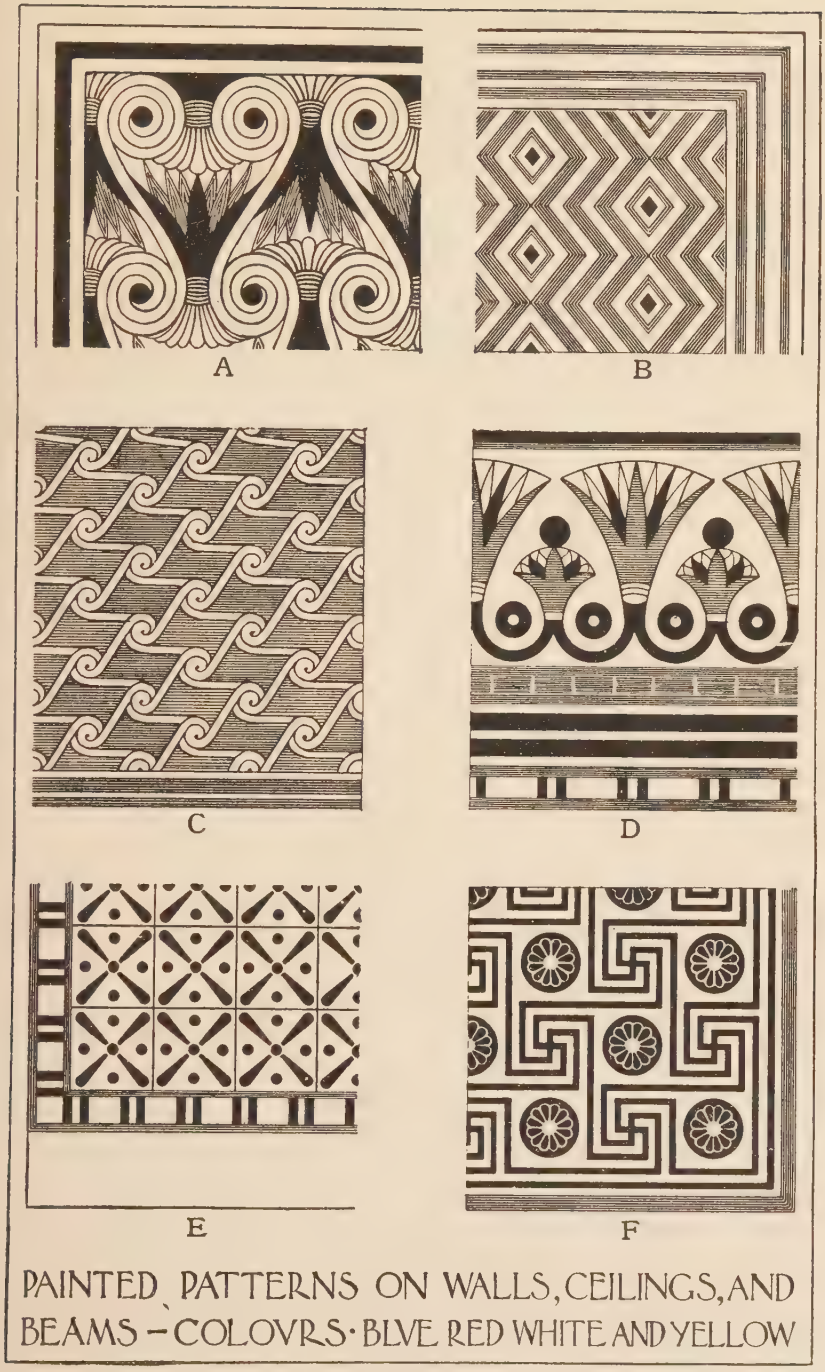


Fig. 21.

Prisse d'Avennes (Bertrand).

The architect.

One word about the methods of work and the status of the architect. In the Boulak Museum at Cairo, many of the instruments used by these early workers are to be seen. There are set-squares, rulers, palettes and paint-boxes, models of pylons, etc., and, amongst other things, plans drawn on stone and coloured to show different materials. Hundreds of architects' names have been preserved on tombs and steles. At Munich "there is a beautiful sepulchral statue of Bakenkhonsou, who was chief prophet of Amen and principal architect of Thebes in the time of Seti I. and Rameses II." Perrot,[1] quoting from Brugsch's history of Egypt, says that architects were "sometimes recruited from the princes of the blood royal, . . . and that all or nearly all married daughters or granddaughters of Pharaoh." He further says, "Brugsch has given us one genealogical table, in which the profession descended from father to son for twenty-two generations."

It is comforting to learn that in the oldest known civilization the exponents of the oldest of the arts occupied so high and honourable a position.

[1] Perrot and Chipiez, vol. ii. p. 177.

COLOVRED TILING FROM KHORSABAD

Fig. 22.
Place (Imprimerie Imperiale).

CHAPTER II.

THE ARCHITECTURE OF THE ANCIENT EASTERN MONARCHIES.

I.—The Kingdoms of Babylonia and Assyria.

Introduction.

No greater difference can well be imagined than that between Egyptian and Assyrian architecture. In Egypt nearly all the ancient buildings are either temples or tombs, the few examples of secular work being unimportant; in Babylonia and Assyria the temples and tombs have disappeared, and little remains except the ruins of royal palaces. In Egypt stone was the principal building material; in Babylonia it was brick. Egyptian architecture is column and lintel construction; Assyrian owes most of its distinction to the general employment of the arch

and vault. No comparisons can therefore be instituted between the work of the two countries, except, perhaps, in matters of decoration. In these the Assyrians followed, to a great extent, the lead of the Egyptians, and although their decorative work possesses features not met with in Egypt, much of their ornament is based on that of the other country.

Babylonia and Assyria, the two oldest of the great Eastern monarchies, comprised that part of Asia which is watered by the great rivers, the Tigris and Euphrates. The earliest inhabitants occupied the country to the south, and formed a number of independent states, bordering upon the Euphrates, which, about B.C. 2300, united to form the Chaldæan or first Babylonian Empire. As civilization spread northwards, colonies were founded on the Tigris which, about B.C. 1700, revolted against the Chaldees and formed themselves into the separate kingdom of Assyria. Constant wars followed between the two countries, in which Babylonia suffered severely. From the ninth to the seventh century B.C. was the period of Assyria's greatness, when Samaria and Judæa were conquered by her, and Egypt successfully invaded. At the end of the seventh century the Babylonians regained their supremacy, and, assisted by the Medes, invaded Assyria, capturing and completely destroying the capital Nineveh. Under the conquering king, Nabopolassar, was founded the second Babylonian Empire, which included the whole of Assyria and ancient Chaldæa, with Babylon as the capital. This empire lasted only about seventy years, being overthrown by Cyrus, King of Persia, in B.C. 539. The country remained under Persian rule until B.C. 330, when, like Egypt and other parts of the civilized world, it was conquered by Alexander the Great.

Until the middle of the last century, very little was known about the architecture of these countries. Not one single building stood above the ground. Even the very sites of the towns were represented only by vast mounds, which tradition stated were where great cities formerly stood. The excavations of the last fifty years, however, by M.M. Botta, Place, Sir Henry Layard, Mr. Loftus, and others, have resulted in many important discoveries, which demonstrate the methods of building and schemes of decoration which were followed.

Reason for decay.

The question that naturally arises is: How is it that the buildings of a civilization so much younger than the Egyptian have perished, whilst those of the older race survive? The

answer is, that where the Egyptians used stone and granite, the Babylonians employed brick, and generally brick in a crude state. The temples of Egypt might become covered up by sand and earth, but the massive columns and beams remained as good as ever, although buried; in fact, their burial preserved them. On the other hand, the crude brick of the more Eastern countries easily perished, especially as heavy storms were frequent there, and rain coupled with centuries of neglect soon caused what had once been common clay, and had never been very much better, to become common clay again. There is some excuse for the Babylonians using brick alone, as the raw material was ready to hand in the vast deposits of clay in the land surrounding the two great rivers, the Tigris and Euphrates, and besides it was practically impossible for them to procure stone. But no such difficulty confronted the Assyrians, and if they had not blindly followed the Babylonian lead, there is no reason why their buildings should not have been as monumental in character as the Egyptian. They did use stone occasionally for facing walls, as at Khorsabad, but always sparingly, and never for the entire thickness of a wall. These facings soon disappeared. Later builders found it much easier to steal the squared stones from existing buildings than to quarry afresh —a species of theft common in all countries and at all times—and then the brick core, exposed and neglected, rapidly disintegrated. Fortunately, the Assyrians used stone and alabaster also as linings for the lower part of their walls internally, and for architectural sculpture generally. Owing to this, our knowledge of their architecture is very much greater than it would otherwise have been.

Character of work.

The architecture of Assyria is so similar to that of Babylonia, that no attempt need be made here to discriminate between the work of the two countries. During all centuries the leading characteristics seem to have been much the same in both. The people were not tomb-builders; no pyramids covered their dead, neither did they conceal them in rock-cut chambers. For this reason all existing remains are either of palaces or of temples.

Temples.

The temples were totally different from those of Egypt at any period of its history. They were pyramidical in form, and were built of crude bricks, faced with burnt or enamelled bricks. They formed solid or almost solid masses, and on the summit of each was the sanctuary, reached by either steps or inclined planes. These temples can never have compared in architectural magnificence with those of the Nile, although, of

course, in height they far exceeded them. Owing to the perishable material with which they were built, they are buried, or rather have buried themselves, and their actual form and ornamentation are to a great extent conjectural.

Palaces. More is known about the palaces. At Nineveh the palaces

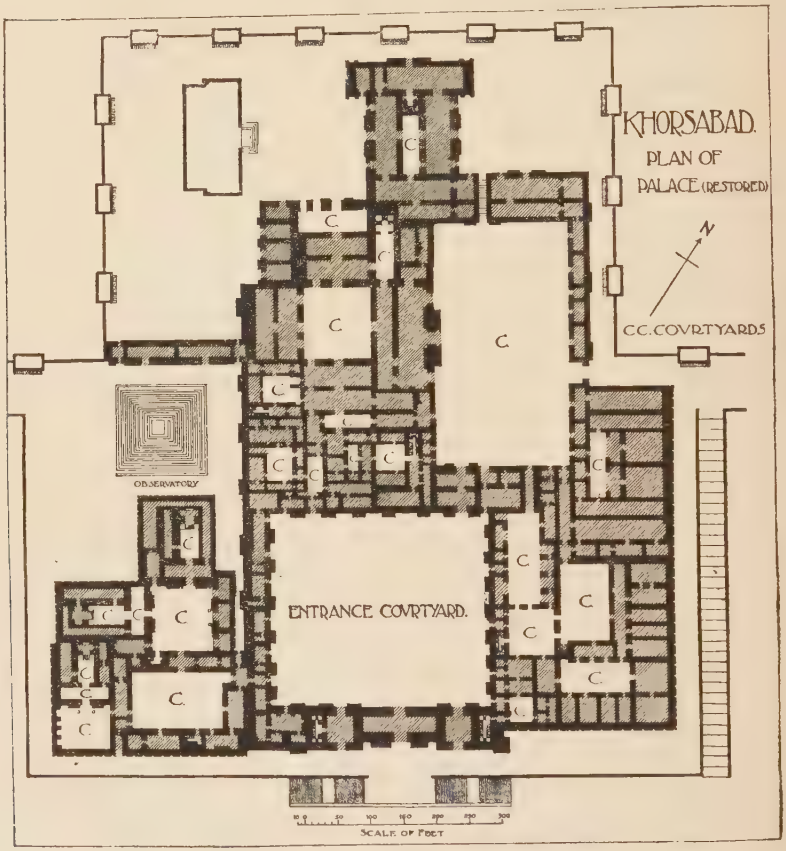


FIG. 23.
Place.

of the last three kings have been discovered, and at Nimroud three other palaces, of which the most important is that of Ashur-nasir-pal (B.C. 885–860). On the site of Babylon, excavations by Sir Henry Rawlinson have brought to light the famous Tower of the Seven Planets, built by Nebuchadnezzar II. (B.C. 604–562). But by far the most interesting discoveries have been made at Khorsabad,

about fifteen miles north-east of Nineveh, of the palace erected by Sargon, the first king of the last Assyrian dynasty (B.C. 772). This has been completely excavated, and its size and extent give a good idea of the grand scale on which the Assyrian kings planned their dwelling-houses.

In plan these palaces are all similar. In each a level platform, raised many feet above the ground, was first formed of crude brick, and this was surrounded by lofty walls of great thickness of the same material. Inclined planes led from the ground below to the top of the platform. The area thus raised and enclosed was covered by courtyards surrounded by rooms. The rooms could only be approached from the courtyards, and thus the privacy so insisted upon in the East was obtained.

Sargon's palace. Sargon's palace was entered on the south-east side by three important arched gateways flanked by human-headed bulls. These led into the great courtyard, 340 by 290 feet. To the left lay the women's quarter, to the right the offices, and on the third side facing the entrances were the royal apartments. To the south-west was the observatory, which, like others discovered elsewhere—such as the Tower of the Seven Planets, at Babylon—was in seven diminishing stages, round which wound inclined planes which led to the summit. The walls of each stage were faced with enamelled bricks, the colour of which was different on each stage, so that when complete the effect must have been exceedingly gorgeous. Three complete stages remain, and a portion of the fourth. The width at the base is 141 feet, and as each stage was 20 feet high, the total height equalled the width at the bottom. The palace walls were in some cases faced with stone, but more often the facings were of either burnt or enamelled brick.

Vaulting. The late Mr. Fergusson held that the ceilings of the different rooms were supported by posts cased with metal. It is true that cedar posts have been discovered with bronze plates attached to them by bronze nails, but it is doubtful if these were employed to any extent in the manner or positions suggested by him. M. Place's investigations all tend to show that the ceilings were not flat, and that the rooms, in most cases at all events, were vaulted with semicircular vaults of crude brick. Above the vaults was filling-in, which was levelled at the top and probably tiled to form the flat roof so necessary in Eastern countries. The proportions of the different rooms and the thickness of their walls confirm M. Place's theory. The rooms are mostly long and narrow,

and the walls are never less than 10 feet thick, and are sometimes as much as 25 feet. Thick walls, no doubt, are a necessity in hot climates to keep rooms cool, but it is doubtful if so great a thickness would have been used if it had not been required to resist the thrusts of vaults. It is certain that the Assyrians employed the vault generally elsewhere, notably over the big drains or canals beneath their palaces, and there is no reason, therefore, why they should not have used it over their rooms. Some of these drains have pointed vaults, others have semi-circular. In both cases the bricks are laid edgewise as in Egyptian vaults, and the different layers often slope backwards.[1]

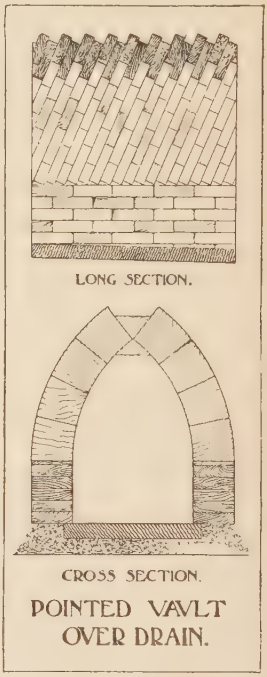


FIG. 24.
Place.

Domes. The squarer compartments may have been domed. Domes are shown on many of the low-relief Assyrian sculptures. One slab from Nineveh, in the British Museum, shows two kinds of domes rising above surrounding walls, one being semi-circular, the other sugar-loaf in outline. The latter could be entirely constructed of bricks with horizontal beds, laid without centering, and would consequently have presented no difficulties in building.

Lighting. The methods adopted for lighting the different rooms are somewhat disputed points. Windows there were none.[2] The door openings are wide, and would consequently admit plenty of light, and in many cases they probably formed the sole source. But such an arrangement would admit heat as well if the openings were left unshuttered, and that was to be avoided. M. Place discovered at Khorsabad a number of hollow cylindrical tubes, or tiles, and these he claims were inserted in the vaults and domes in order to provide not only light, but also ventilation. The tubes

[1] If M. Place's illustration, reproduced here, is correct, the bricks were shaped to give greater strength, and were not rectangular.

[2] Semicircular-headed windows were placed in the towers guarding the gateways of city walls, and are shown in some of the sculptured slabs in the British Museum (see especially slab No. 57 in the Assyrian Gallery), but it is exceedingly doubtful if they were employed to light any of the rooms of Assyrian palaces.

could easily have been placed in such positions and at such slopes that the sun's rays could not enter, and the rooms, which were exceedingly lofty, consequently be kept cool.

Gateways.

The most characteristic features of Assyrian architecture were the wide-arched entrance gateways in the city walls. The arches sprang from the backs of great human-headed winged bulls (or lions, as in the palace of Assur-nasir-pal at Nimroud), which projected slightly in front of the wall, and were carved along the sides of the entrance. These animals were in alabaster or granite, as these materials could best withstand the wear and tear to which they must have been subjected. They thus had a practical as well as an æsthetic value. Some of the archivolts at Khorsabad were faced with enamelled tiles in different colours. This is an early instance of the arch being made a decorative feature, which, so far as is known, the Egyptians did not attempt to do. The doors themselves were of bronze, or of wood covered with plates of metal. Perrot and Chipiez, quoting Herodotus, state that the walls surrounding Babylon "had one hundred gates, all of bronze; their jambs and lintels were of the same material." This description, if correct, shows that these openings were not arched, and also that the jambs could not have been carved like those of Assyrian gateways. The

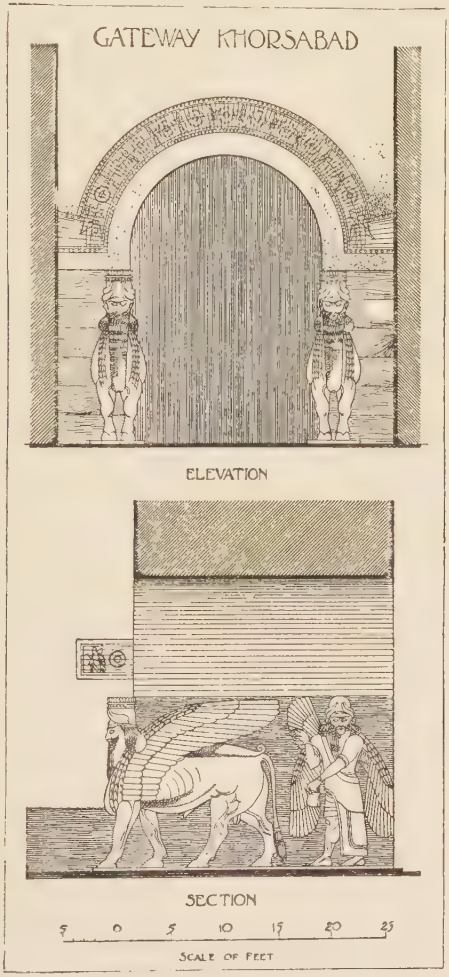


FIG. 25.
Place.

differences in this respect between the treatment in the two countries are only what might have been expected, considering the difficulties the Babylonians experienced in procuring stone.

Decoration.

What little is known of Assyrian methods of decorating their buildings is gained chiefly from their sculptured slabs. External walls had pilasters at intervals which reached from the bottom to the top—one slab in the British Museum from the palace of Assur-bani-pal at Nineveh, shows attached columns and pilasters starting from the backs of lions and winged griffins —and were crowned by stepped battlements. Internal walls were plastered above, and probably painted, whilst the lower parts were lined with stone or alabaster slabs carved with considerable freedom in low relief. In place of carved slabs enamelled bricks or tiles were sometimes used. The background tiles were generally blue; yellow was used for bands and for figures of animals; and white for the petals of the rosettes. The animals are drawn with great boldness, and character, and the whole effect must have been most striking and decorative (see Fig. 22). The ornaments used by the Assyrians are only known through their tiles and carved slabs. The "guilloche" was frequently used as a border, but the favourite ornament is that commonly called a "palmette." There is little difference between this and the "lotus leaf" ornament of the Egyptians (see D, Fig. 21); the leading lines are much the same, but the bunches of leaves follow the forms of Assyrian plants and flowers instead of Egyptian. Many of the best examples of Assyrian ornament are on the carved thresholds and pavements, of which some are in the British Museum.

Columns.

The Assyrians cannot be said to have had a columnar style of architecture, and in this respect their work differs essentially from that of the Egyptians, Persians, and Greeks. They apparently used columns between pilasters in some cases, if the sculptured representations of fronts of buildings can be taken as a guide, but there is nothing to show definitely of what material these columns were made. From the carvings it appears that the capitals either had volutes, like those of the Greek Ionic order, or else were carved with leaves, as in the later Greek Corinthian (see pp. 63–66); but no actual example of either type exists. The one or two stone capitals which have been discovered are very different. These sculptured representations

Fig. 26.

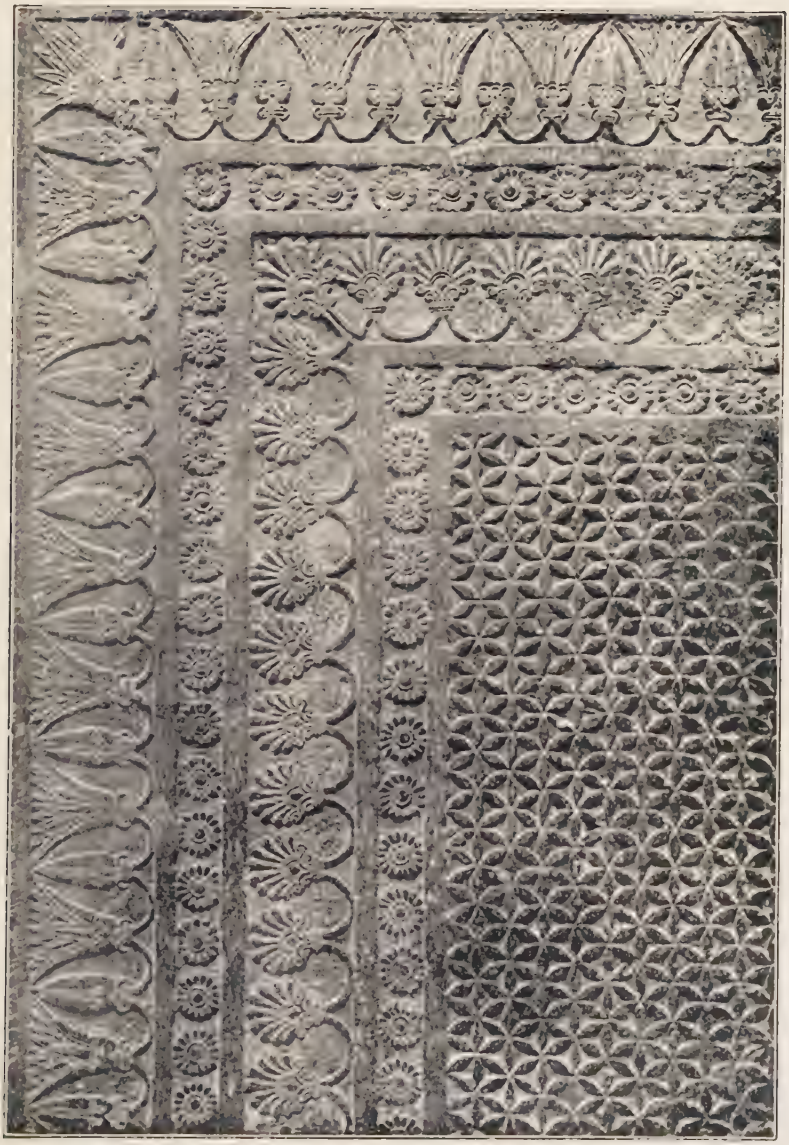


Photo: Mansell & Co. FIG. 27.—ASSYRIAN STONE THRESHOLD.
(Now in British Museum.)

[*To face p.* 40.

cannot be regarded as proof that the Assyrian capitals were the proto-types of Greek ones. The volute, or spiral, form was always a favourite in the East from very early times. It is found on all ornaments; and when carved on a wood bracket above a post, as it doubtless often was, naturally suggested the volutes which afterwards became so especial a feature of the Greek Ionic. All that these carvings prove is, that columns with carved or moulded capitals were used in Assyria some time previous to the Persian invasion.

II.—The Kingdom of Persia.

History.

Persia is the last of the great Eastern empires. The first important date in its history is the conquest of the Medes by Cyrus, King of Persia, about B.C. 558, and after that the empire rapidly grew. Lydia and the Greek colonies were added to it by Cyrus, who in B.C. 539 also captured Babylon; and his son, Cambyses, conquered Egypt in B.C. 525. Darius and Xerxes are known to every one for the wars they waged with Greece, which ended in the complete defeat of Persia, B.C. 480. The empire was finally overthrown by Alexander the Great, B.C. 331.

Origin of work.

This period of about 220 years is indeed short when compared with the many centuries of Egyptian art. The Persians had no architectural style before the time of Cyrus, and they consequently absorbed the detail of those countries, Assyria, Egypt, Greece, with the inhabitants of which they came in contact. From Assyria they borrowed their sculpture, both in high and low relief; and from Egypt, their columned halls and much of their architectural detail. From the Assyrians and Babylonians they also learnt the value of raised platforms and terraces, approached by wide and dignified flights of steps. These they luckily built in stone, and not in perishable brick—owing possibly to Egyptian influence—and they form the most distinctive feature of Persian architecture. There is nothing to be compared with them in the earlier Egyptian, or in the later Greek work, and at no subsequent period have they been excelled. Besides the platforms and staircases, the columns supporting the roofs of the great halls were also of stone. And yet it cannot be said that the Persian style is a lithic one like the Egyptian. The upper parts of the buildings, the roofs, and the beams which rested on the columns were of wood. Two or three reasons may be suggested for this: in the first place, wooden

beams allow a much wider spacing of the columns than is possible if stone be used, and also permit of the columns themselves being of more slender proportions. These are important considerations in halls of assembly intended to accommodate great numbers of people. In Persian palaces an open unencumbered floor space was a first necessity; it was not of such account in Egyptian temples. Another reason is that stone, although it was plentiful and easily procurable, was possibly not obtainable in blocks of sufficient length to span openings of even moderate dimensions; and as a third reason may be mentioned the lighter, more fanciful taste of the Persian monarchs—a trait discernible in all Asiatic nations—which led them to dislike the heavy, somewhat clumsy proportions in which the Egyptians took such delight.

Principal buildings.

The principal buildings of the Persians, of which portions still exist, are royal palaces and tombs. Their temples were small and unimportant, as large buildings were not required for their religious rites, and the few remains of them are of no interest architecturally.

Tombs.

Their tombs are of two kinds. Those at Pasargadæ, the holy city, are, in most cases, of the time of Cyrus, and although of considerable archæological value, possess small architectural merit. The most important are raised on lofty steps, have sloping roofs which terminate with pediments, and in other respects bear a close resemblance to small Greek temples. The other tombs are rock cut; and although they cannot compare in scale or magnificence with Egyptian examples, are of considerable interest. Several are hewn in the cliffs behind the palaces at Persepolis, others are at Naksh-i-Rustem, amongst the latter being the tomb of Darius. They are all alike, except for small differences in detail. Their rock-cut façades are ornamented with columns and entablatures, which are evidently reproductions of the fronts of palaces. This constitutes their chief claim to be regarded as of architectural value, as they show detail, notably in the entablatures, of which no remains otherwise exist. The entablatures of the palaces, being of wood, have long since disappeared; but from these rock-cut examples, which are manifestly copies of timber construction, it is possible to form a fairly good idea as to their appearance.

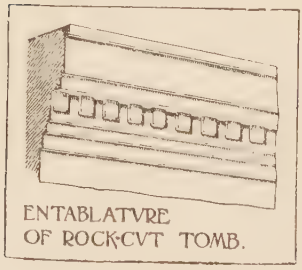


Fig. 28.

The principal palaces are at Persepolis, east of the Persian Gulf, at Susa, near Babylon, and at Istakhr. They all bear a strong resemblance to one another; the style changed little during the two hundred and odd years that it flourished, and the differences between early and late work appear to be immaterial. The palaces at Persepolis are the most extensive, and they are also the best preserved. They belong to the reigns of Darius and Xerxes (B.C. 521–465), who also built the palace at Susa. They consist of a number of columned halls with entrance porticoes, in front of which sometimes stand detached vestibules, or propylæa. They are dotted about somewhat unsymmetrically on top of a high platform, at the foot of the mountain in the side of which

Palaces.

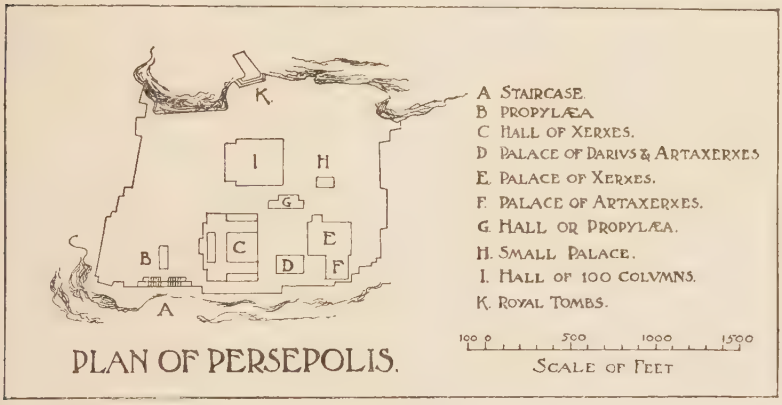


Fig. 29.

are excavated the royal tombs. This platform is raised 30 to 40 feet above the ground, and its retaining walls are built of large blocks of stone, laid without mortar, but held together by metal cramps run with lead. It is approached from the plain below by a great flight of steps, at the top of which stand the entrance propylæa. The other principal buildings on the platform, all of which are on slightly different levels, are the small and large halls of the palace of Xerxes, the hall of the palace of Darius, and that known as the hall of the hundred columns. In front of each is a staircase planned on the same lines as the great staircase. The latter is plain, but the sides of the smaller flights are elaborately carved with figures and animals in low relief, a figure corresponding to each step, so that a regular procession is formed from bottom to top.

The halls.

The great hall of Xerxes and the hall of the hundred columns are about the same size (230 feet square), but the former only contained thirty-six columns in six rows. These, however, are much larger than the others, being 64 feet high and 5 feet in diameter, and the hall must consequently have been by far the more magnificent. On three of its sides externally were porticoes of twelve columns each, in two rows, the same height as the others, making the number of the external and internal columns the same. A good idea of the difference in proportion between Persian and Egyptian architecture can be obtained by a comparison of this hall with the hypostyle hall at Karnak. In area they are about equal; but whereas the Persian example contained only 36 columns, the Egyptian one had 134. From this it might be supposed that the latter are the more slender, but, so far from this being the case, their diameter is considerably more than double that of the others. The central columns in the hall at Karnak are practically the same height as those of the hall of Xerxes, but in the one case the proportion of height to diameter is about 5½ to 1, in the other it is nearly 13 to 1. The walls that surrounded the halls, being of brick, have disappeared, but in one of the smaller palaces some massive openings in stone still remain standing These are very simple in design. A *sunk* architrave surrounds each, and above is a moulding very similar to the Egyptian "gorge."[1] Some of these openings are undoubtedly doorways, others may have been windows, but they cannot have been the only source of light. It has been suggested that some sort of top lighting was adopted for these halls—somewhat after the fashion of the clerestory windows of the Egyptians—but of this no proof exists.

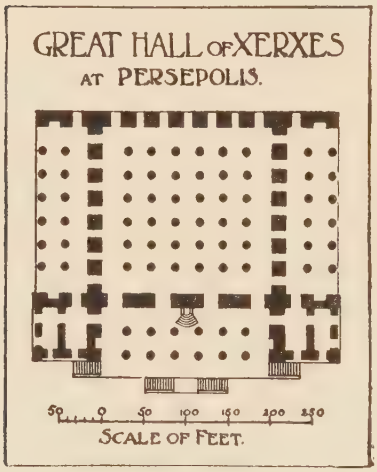


Fig. 30.

Columns.

Persian columns are not only far more slender than Egyptian,

[1] The sunk architrave is characteristic of early work, and occurs also in Mycenæan work in Greece (see Fig. 37).

but, in addition, their height is emphasized by numerous channels, or "flutes." Those at Istakhr have thirty-two flutes, whilst some of the Persepolis ones have as many as fifty-two. The capitals are very different from those of any other country. Some of their features indicate an Egyptian or even an Assyrian origin, although on the whole these are more likely to have been suggested by earlier capitals in wood which were decorated with applied metal plates. They are of two kinds. The simplest, which are found in the porticoes of the great hall of Xerxes and in some of the smaller buildings, consist merely of twin bulls, with their legs doubled under their bellies and their backs hollowed to receive the wood beams which crossed the ceiling. This form is particularly well adapted for its purpose; in fact, in no other style have beams a more perfect bearing. In the other and more elaborate form of capital, the upper portion is similar, but underneath the bulls is a rich but meaningless arrangement of volutes, followed in some cases by carved and shaped blocks, the design of which appears to have been taken from some of the Egyptian capitals, or from prototypes in wood.

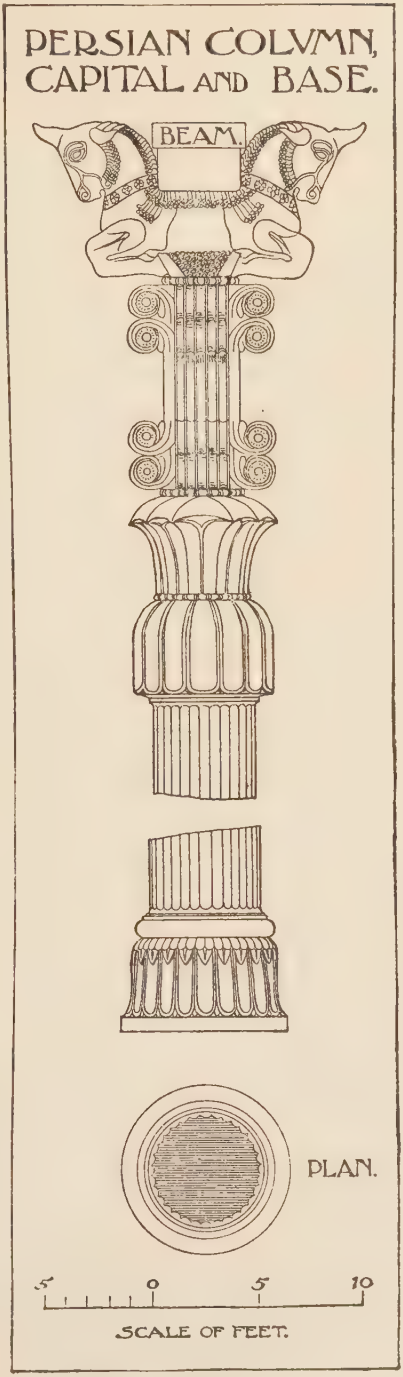


Fig. 31.

Examples of the elaborate capital occur at Persepolis in the interior of the great hall of Xerxes, in the hall of one hundred columns, and in the propylæa at the top of the big staircase; and also at Istakhr and Susa. The bases are lofty, and are, as a rule, very elaborate and exceedingly graceful. Beautiful examples have been found at Istakhr, Susa, and Persepolis.

Decoration.

Persian decoration bears a close resemblance to Assyrian; the sculpture is much the same in both countries, and the two nations resemble one another in their use of enamelled tiles. At Persepolis the large doorways of the entrance Propylæa are flanked by immense human-headed winged bulls, which might have come from Khorsabad; and the low-relief carving on the staircases is of the same character as that on the slabs which lined the internal walls of the palaces of Nimroud and Nineveh. As regards the use of coloured tiles, whether the Persians learnt the art from the Assyrians, or whether they practised it before they were brought into contact with them, is uncertain, but some of their work in this most fascinating of decorative methods is very fine.[1] In all Persian decorative work, whether carved in stone or painted on tiles, the pyramidical tree, or pine-cone form, which is so characteristic of more modern Persian tiles, occurs frequently. The forms reproduced at the present day may date back to the time of Xerxes, and the secrets of the glaze and methods of firing may be older still. In the West, similar secrets have been lost, or have given place to modern "improvements;" but in the East, traditions which have been handed down from father to son for generations still linger, although, alas! much recent work shows that their days are numbered, and that they too will soon be forgotten.

III.—Other Eastern Nations.

Of the architectural work of other Eastern nations it is unnecessary to speak. The Jews and the Phœnicians were not builders. No doubt the latter, through their trade, assisted in spreading the arts of Egypt and Assyria along the shores of the Mediterranean, and in the neighbouring isles, but otherwise their influence on building development was slight. From the descriptions of the temple at Jerusalem, it is evident that it was without architectural

[1] In the famous tiles from Susa, in the Louvre, the figures are modelled in slight relief.

pretensions, although it was raised on a lofty and extensive platform, and was enriched with a certain amount of applied decoration, metals being used freely as in Assyrian work.

Lycian tombs.

In Lycia, in Asia Minor, are several tombs, which are either excavated in the mountain side, or else are carved to the required shape out of isolated masses of rock, the surrounding stone being cut away to allow them to stand free. These are sometimes referred to as proof that early buildings in stone are copies of wood construction. But this is a mistake. They are not buildings at all; there is no construction in them; they are simply carved forms. M. Texier, in his "Description de l'Asie Mineure," describes them as "des saillies de roches équarries et évidées." At the time they were executed, about the seventh century B.C., there was little or no stone building in Asia Minor, and the workmen consequently carved the rock into the forms with which they were familiar in wood. But if these tombs had been built up in courses, their appearance, shape, and ornamentation would have been very different. Each material demands its own treatment; and this is often more apparent when work in that material is in its infancy than when it has reached perfection, because whenever a nation begins to build in stone, or in anything else, it builds simply and frankly, and often without any ornament at all. When ornament is introduced, it is a natural outcome of the construction employed, and although occasionally some detail reminiscent of another material may occur, this has been translated because it was regarded as especially suitable. The only exceptions which might be advanced are the Egyptian mastăbas, but in these the walls are so thick and the voids they enclose so small, that they may almost be

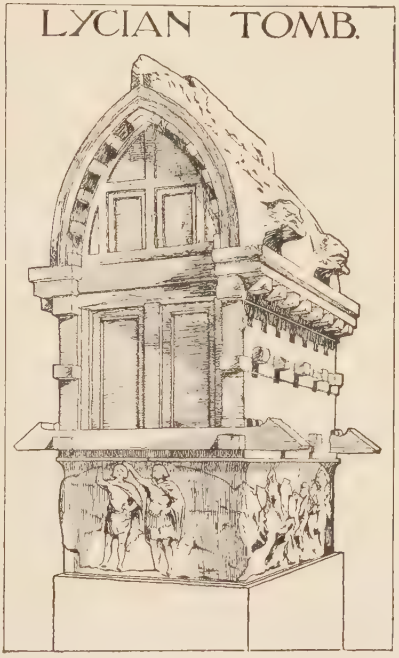


Fig. 32.

regarded as solid blocks of stone which could be carved without reference to their construction.[1]

[1] The Lycian tombs are not the only ones in which wood forms are imitated. In the Beni-Hasan tombs (see Fig. 6) the portions of the rock which overhang the beams are carved in imitation of rafter-feet, and in the rock-cut Persian tombs a timber entablature is represented; but these, like the tombs in Lycia, are not buildings.

CHAPTER III.

GREEK ARCHITECTURE.

First Period.

Fig. 33.

Introduction.

The early inhabitants of Greece, commonly called the Pelasgi, have left many and interesting examples of their labours in different parts of the country. These differ in many respects, especially in construction, from the work of the second, or Hellenic, period, which will be considered later. Who these early inhabitants were, where they came from, and when they flourished, are matters about which there is much dispute. That they were in some way akin to the Egyptians, or at least possessed many of their traits, seems certain. At Crete, that halfway house between Egypt and Greece, recent discoveries have brought to light extensive works of this race which are stated to be as early as 1800 B.C., but it is doubtful if any of the extant remains in Greece are before 1500 B.C., and most of them are probably three to four hundred years later. For the purposes of classification, the work may be taken to extend from 1200 B.C. until the commencement of the Olympiads in 776 B.C. Royalty ceased at Mycenæ, the most important of the Pelasgic towns in Greece, at the time of the Dorian invasion, which is generally stated to be 1104 B.C., although Dr. Schliemann believes that it was earlier. The traditions probably lasted for two or three centuries later. In all the remains of this period Egyptian and Eastern influences are strongly perceptible. These are shown in the stone-built tombs, such as those at Mycenæ ; in the ornamentation which enriches the few fragments of architectural detail which still exist, and in the many beautiful examples of jewellery and pottery, found from time to time in the tombs, which are now to be seen in the Museums of Athens, Berlin, and other capitals.

Orna-ments.

A strong family likeness exists between these last and similar examples of Egyptian and Assyrian make. Some experts hold that much of this work was imported from those countries; but many specimens must be of local origin. Warlike scenes and representations of a domestic character are often embossed or chased on gold and on silver cups, on the sword-blades, and on the signet rings, of which, fortunately, so many have been discovered. Animals are represented sometimes conventionally, sometimes more realistically; lions, panthers, dogs, and butterflies abound. All these show evidences of very considerable technical skill, proving that the art was by no means in its infancy. A favourite form of ornamentation is the spiral, which is frequently found covering the entire surface of some of these articles. The spiral, it must be remembered, is not necessarily of Eastern origin, although it occurs so frequently in the work of the East. As applied in these examples, it is the natural outcome of the materials used and of the methods of working them; in fact, in all existing specimens the suitability of the design to the material strikes one even more forcibly than the excellence of the workmanship itself. This is especially noticeable in the gold buttons, with the butterfly patterns, found by Dr. Schliemann at Mycenæ, which are now in the museum at Athens (see Fig. 33).[1]

Many of the characteristic enrichments which were afterwards so common in Hellenic architecture, some of which have already been met with in Egyptian, Assyrian, and Persian work, such as the fret, guilloche, etc., are frequently to be found on the pottery and metal vessels of this period; and these, more than the scanty fragments of carving, help towards a better understanding of the decorative art of this bygone civilization.

Examples.

The principal architectural examples remaining are city walls, entrance gateways, and tombs. As regards the two first, security from attack was in those days an absolute necessity; consequently, not only were the sites of cities carefully chosen, but their natural strength was increased as much as possible by lofty, solidly built, stone walls, special care being taken to guard and protect the entrance gateways which gave access to the cities. The strength of the walls, the precautions taken to guard against surprise, and, what is of still greater importance to us, the methods of building which then prevailed, can be well seen in the existing remains at Mycenæ, between Corinth and Argos, at its neighbour

[1] The butterfly was the symbol of immortality.

Tiryns, at Messene, and elsewhere; and a good idea of the commanding nature of the sites which formed the original citadels of the early settlers can be obtained by a study of the Acropoles of Athens, Acro-Corinth, and Ithome, the last being the highest part of the ancient city of Messene. Little, considering its former splendour, exists to attest the glory of Troy, in Asia Minor, which about this time was at its zenith; but much has resulted from the investigations now proceeding at Knossos, in Crete. Already the foundations and other portions of a royal palace, covering four or five acres, which promises to rival Tiryns, have been brought to light, together with examples of painted pottery, and inlay work in gold, ivory, crystal, and enamel. Portions of the original frescoes are still visible on the walls, and wide staircases of stone lead to remains of upper storeys.

Materials and workmanship.

The city walls at Mycenæ and Tiryns are built of huge blocks of stone of various shapes and sizes, worked and laid in different ways. Sometimes the stones are roughly wrought, sometimes they are unwrought; in the latter case the joints, which are of clay, are often filled with smaller stones, *i.e.* galetted, like the Egyptian arch mentioned before.[1] In other instances, walls are built of polygonal stones, well fitted together; but the best examples have the stones carefully squared and bonded one with another without mortar of any kind. The walls of houses were often of stone for a few feet above the ground, and of sun-dried bricks above. Walls built in this fashion were covered inside and out with thick layers of stucco. Stone was also used at the angles of buildings to stiffen them—much in the same way as it is still used in some parts of England, Scotland, and Ireland, when the rest of the walling is of rough rubble—and for thresholds, linings, doorways, and openings. A fragment of alabaster *in situ* at Tiryns proves that this material was sometimes used, as in Assyrian work, for lining internal walls, but very little is authentically known about the internal decoration of this period. Much of it doubtless was "applied," and has consequently disappeared. Bronze probably played an important part, as in Eastern work, for casing posts and beams, and for ornamenting doors and other portions of the buildings which required special treatment.

Arches.

Both the arch and the lintel are employed; a favourite

[1] See p. 24. "Galetting" is still practised in "Kentish-rag" work in Ken and Surrey.

arrangement being a combination of the two, in which the opening is spanned by a lintel, over which is a discharging arch which prevents the weight above from crushing it. None of the arches, whether used alone or in combination with lintels, are built with radiating voussoirs; all have the beds of the stones horizontal, each course projecting slightly in front of that below. Some are pointed in form, a few are semicircular, but most are triangular. At Missolonghi, the openings in the walls are simple triangles, there being no vertical sides at all. Between these examples, therefore, and the pointed arches of the Middle Ages, there is considerable difference. The form, it is true, is often the same, but the construction is very different.[1] An interesting instance of the arch form being used as a vault is at Tiryns. There a long gallery is covered over throughout its entire length by big stones, with horizontal beds, which form a triangular-shaped roof. This is in a very good state of preservation, and so is the little postern gateway in the same building, of similar construction, which provides access to one of the minor approaches to the citadel.

Tiryns.

The ruins at Tiryns are principally valuable as providing the most perfect example in Europe of the planning of an early palace, or chief's dwelling-house (Fig. 34). The remains cover a considerable portion of the ground within the city walls, and occupy the highest and most commanding position on the acropolis. The propylæa, or entrance vestibules, and the separate open courts and suites of apartments for the men and for the women, the two being kept distinct with different entrances and exits, can easily be traced. Little remains of other houses within the walls, but this one large example is more valuable than a host of small ones.

Mycenæ.

The great attractions at Mycenæ, which render it the most interesting of all the early cities in Greece, are the city walls, the tombs, the Agora, or circular enclosure on the Acropolis, and the famous Gateway of the Lions, which forms the principal entrance to the Acropolis.

The Lions' Gateway.

The approach to the gateway is by a long passage, about 30 feet wide, which is flanked by lofty walls built of large squared blocks. This afforded splendid protection to the main entrance to the town, and rendered it difficult of attack and easy of defence. The gateway itself consists of two massive uprights supporting a

[1] One of the cups discovered by Dr. Schliemann at Mycenæ is ornamented by a band of pointed arches carried on columns, and another has semicircular arches on top of pilasters, but there is nothing to indicate the construction in either.

stone lintel, over which, to carry the weight of the wall above, is a triangular arch similar in construction to those already described.

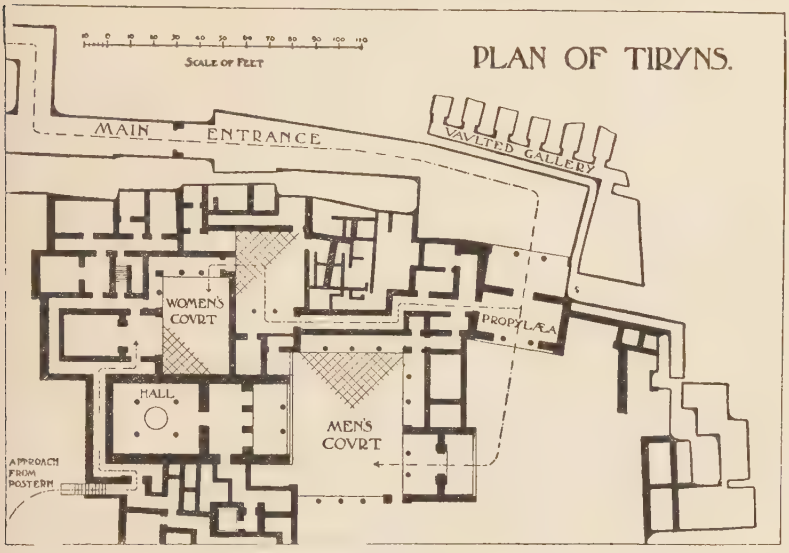


FIG. 34.
Schliemann (Murray).

The space thus enclosed is filled by a single sculptured slab, on which are carved two lions erect, supporting a central column of unusual design. The heads of the lions are missing. These were in separate pieces, and it is suggested that they were of bronze.

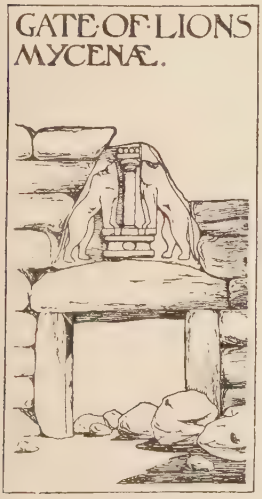


FIG. 35.

Tombs.

The tombs at Mycenæ are of two kinds; those within the precincts of the Agora, in which Dr. Schliemann discovered the many valuable and beautiful articles now in the museum at Athens, are without architectural pretensions; whereas those said to be of Atreus and Clytæmnestra, which are outside the walls, are very differently constructed, and were richly decorated. These and other similar ones at Orchomenos (Skripoú), Patisia, near Athens, and elsewhere in Greece, are circular in plan and pointed in section.

They are built of huge blocks of stone with horizontal beds, the ends of which are weighted by other stones to keep them in position. Each was covered with a mound of earth. Internally they form pointed domes, the curve of the sides starting from the floor, and owing to this the term "bee-hive" is generally applied to them. The approach to each is by a stone-faced passage, or dromos, the masonry of which is executed with great care and precision. The tomb of Atreus is the largest and most important of its kind, and is in a far better state of preservation than that of Clytæmnestra close by. The principal chamber is 50 feet wide internally, and its height is rather less. It was decorated with applied ornament in bronze, either in the form of plates which covered the whole surface, or else with rosettes at intervals. The holes for the bronze pins by which the plates or rosettes were fixed are drilled in the stones. Opening out of this chamber is a smaller one, excavated in the rock, where the body was placed. The circular portion was possibly the meeting-place for friends and relatives, such as was provided in the Egyptian mastăbas. The entrance doorway at the end of the dromos is of fine dimensions, and is spanned by an enormous lintel—much bigger even than that forming the head of the Lions' Gateway—which reaches back to the internal face of the tomb. Over this is the usual triangular opening, now empty, but filled originally with a sculptured slab, of which a fragment of red marble in the museum at Athens is said to be a part.[1] Round the opening is a simple sunk architrave, similar to those at Persepolis; and on

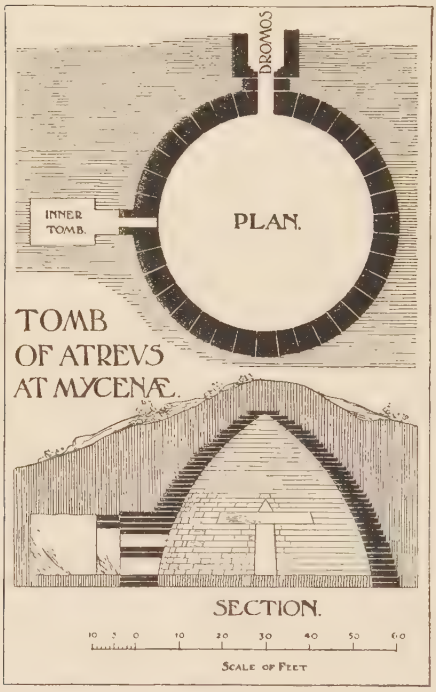


FIG. 36.

[1] Other fragments are in the British Museum.

Photo: S. C. Atchley.

FIG. 37.—ENTRANCE TO TOMB OF ATREUS, MYCENÆ

[*To face p.* 54.

each side of the doorway was placed a half-column against the wall.[1] These were formerly supposed to have been whole columns, and to have stood detached, but the remains of them which have been recently acquired by the British Museum show that such was not the case. They are in reality rounded pilasters, semi-elliptical in section; and although they are slightly wider at the top than at the bottom, the taper is very much less than is shown in book illustrations, in fact it is hardly perceptible. The material is dark grey limestone, and the carving of the spiral ornament and diagonal fluting which cover them is of extreme delicacy.

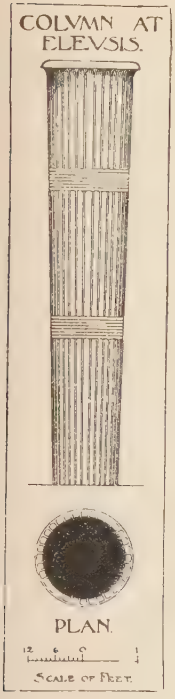


Fig. 38.

Two columns which now stand outside the museum at Eleusis, near Athens, have a more strongly marked taper, and, as in the Mycenæan ones, their greater width is at the top. They are probably of the same date as the others, but are much plainer. Their capitals are more reminiscent of Egyptian than Asiatic ones, and their shafts have V-shaped sinkings broken by bands. The resemblance between them and those Egyptian columns which are carved to imitate bundles of reeds tied together in the middle is therefore somewhat striking.[2] Eleusis.

The remains of this period in Greece, although not numerous, are sufficient to show the connection which exists between them and contemporary examples elsewhere, and also the extent to which they differ from later Greek work.

[1] The doorway is 18 feet high, and diminishes in width from 9·2 at the bottom to 8·6 at the top. This diminution in width—a peculiarity which occurs also in the Lions' Gateway—is common in later Greek doorways.

[2] It is possible that the form was suggested by the swathed Egyptian upright figures, which in outline they much resemble.

CHAPTER IV.

GREEK ARCHITECTURE.

Second Period.

Introduction.

Several centuries intervene between the work just described and that of the second period. The older civilization had passed away long before the examples which still exist of the later school were erected, and the connecting links have almost entirely disappeared. It is, consequently, impossible to state definitely how the evolution proceeded during this long period; but certain facts are known, and from these one is able to state, with some degree of certainty, what the influences were which most affected the development of Greek art.

From its geographical position, Greece was early brought into contact with Egypt, Assyria, Persia, Phœnicia, and other countries. Its inhabitants were merchants and sailors, trading with or voyaging to the different towns along the coast, and to the islands at the east end of the Mediterranean, and thus the arts of the older civilizations were brought to its shores. From Egypt the Greeks inherited the massiveness which afterwards distinguished their buildings of the Doric order; from Assyria and Persia they acquired the love of rich detail, and the lighter, more delicate forms noticeable in those of the Ionic; and from the Phœnician artificers they learnt the secrets of the many minor crafts in which that race excelled. Colour came natural to them, as, to this day, it does to all dwellers in the East, where vivid colouring is not only possible, it is imperative. The Greek colonies spread along the coast of Asia Minor; in the seventh century B.C. Greek settlers were invited to Egypt by Psammetichus, and in the middle of the following century, under Amasis, the great trading city of Naucratis rose to vast importance. But this close connection with other nations does not account entirely for the development of Greek architecture. The differences discernible in

buildings of contemporary date in Greece are partly due to the fact that the country was not a united one, inhabited by people of one race only, and acknowledging one supreme head. Different races occupied different parts: where one race predominated, one style was followed; where another race was supreme, the work possessed other characteristics; and where, as at Athens, an admixture of races existed there was a divergence of opinion, and buildings stood side by side, like the Parthenon and Erechtheum, which, although agreeing in construction, differed considerably from each other in other respects.

Period. Hellenic Greek architecture may be said to start from the commencement of the Olympiads, B.C. 776, and to extend to the taking and sacking of Corinth by the Romans, B.C. 146. No examples exist so early in date as the eighth century B.C.; and, on the other hand, Greek art did not cease with the Roman occupation; in fact, as late as the Christian era it still possessed considerable purity. The style was at its zenith between the years 480 B.C.—the date of the battle of Salamis—and 323 B.C., the year when Alexander the Great died. The final victory of the Greeks over the Persians marks the turning-point in Greek art. The country, freed from all fear of invasion, flushed with victory, and rich with the spoils of war, was able, for some little time, to turn its undivided attention to the arts of peace, and under Pericles, who was controller of public works in Athens from 460 to 429 B.C., the temples and other public buildings were rebuilt on a scale and with a beauty far surpassing all those which had gone before. This short period, from the middle to the end of the fifth century B.C., is the golden age of Greek art; when the greatest masterpieces of ancient architecture were produced, and when the art of the sculptor reached a point far in advance of the earlier work, fascinating and beautiful though many of the archaic figures are. After that the Peloponnesian wars interfered greatly with the progress of art in Greece, and caused dissensions from which the country never entirely recovered.

Sites. The methods of building followed by the Greeks were largely due to the fact that the climate permitted of an out-of-doors existence, and of open-air ceremonials which in more northern climates are impossible. The effect aimed for, therefore, was chiefly an external one. The temples were built more as shrines to contain the figures of the deities in whose honour they were erected, than as churches in which to worship them. The

entrance to the temple faced the east, so that the sun could shine in at dawn, and in front was a courtyard, in the centre of which stood the altar for sacrifice. The positions the temples occupied often had much to do with their design. Many of them were not in towns, but in sacred enclosures, such as those at Olympia, Delphi, and on the island of Delos. The large buildings necessary at these centres for the accommodation of the thousands who journeyed there on days of high festival were outside the enclosures. The games at Olympia and the oracles of Delphi and Delos were great institutions. At the first named, the huge temple of Jupiter Olympius rose in the centre of a crowd of smaller buildings and shrines, all connected with the functions held there. There were gateways and propylæa, and halls and porticoes, where historians, poets, orators, and philosophers read or recited their works, or declaimed their theories; there were smaller temples and homes for the priests; and, in addition, treasuries, or small buildings, belonging to the most important towns of Greece and her colonies, in which works of art could be stored, and everything necessary for the games and religious celebrations kept. All these were of the same style of architecture as the great temple, and each was doubtless as richly ornamented as the artist and handicraftsman could make it. Sometimes a portion of a city was set apart as sacred, as at Athens, where the Acropolis, once the stronghold of the town, chosen by the early settlers because of its strength and commanding position, became after the Persian wars (perhaps before) the religious centre (Figs. 39, 40); or as at Girgenti, in Sicily, where a group of five temples lined the south side of the town, overlooking the Mediterranean, and extended for about a mile in length. Few sights can have been finer than these temples, one much larger than the Parthenon at Athens, standing up in brilliant sunshine above the long, straight, lofty wall which crowned the steep slope on top of which that part of the city stood.

Reasons for few examples.

The disappearance of so many buildings which formerly existed, and the deplorably ruined condition of others, are not due entirely to lapse of time, great though that is, to municipal changes, or to structural faults. The method of construction adopted, the materials used, and the area and strength of the supports would, under ordinary circumstances, have ensured their preservation, in most cases, to the present day. Many of the early examples were destroyed by the Persians when they overran portions of Greece, and those which survived the invasion were in several instances pulled

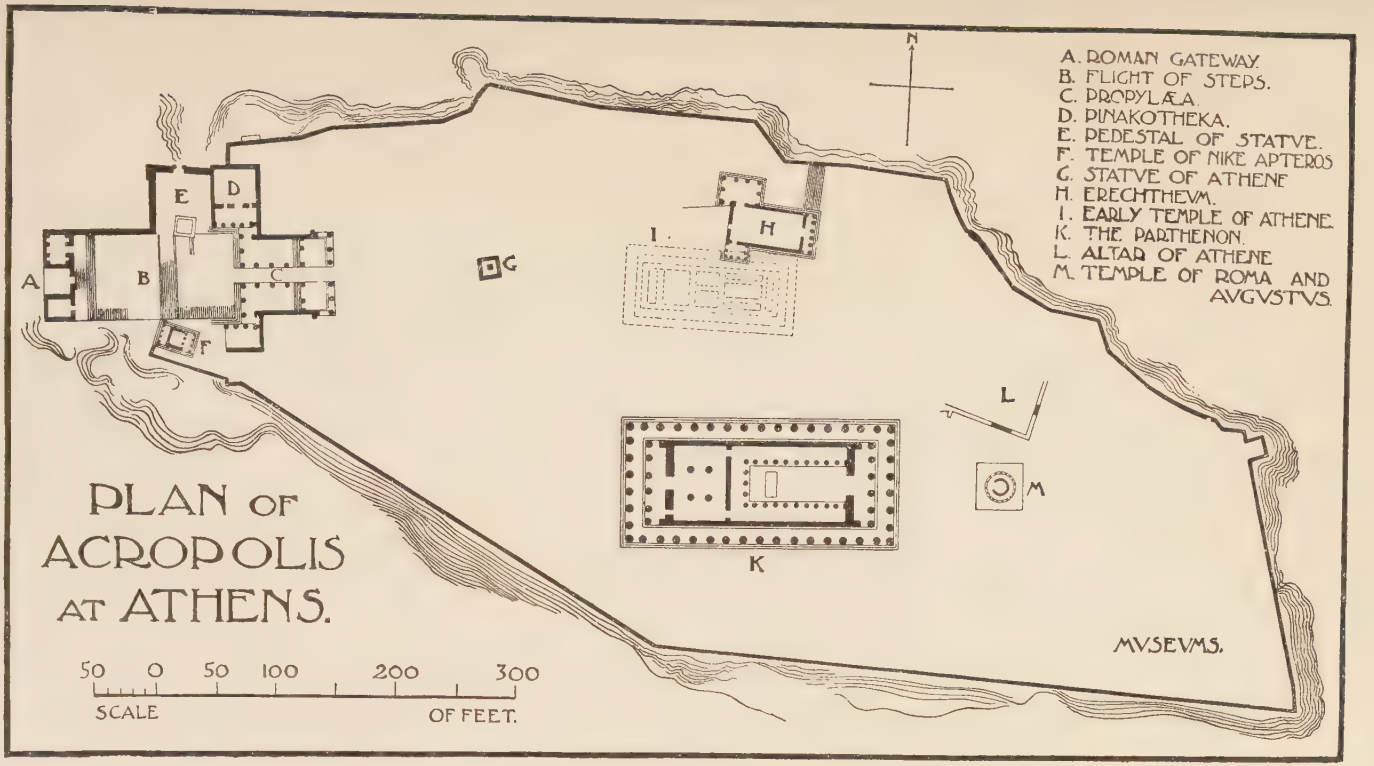


FIG. 39.

Middleton and Gardner (Hellenic Society).

down by the Greeks themselves, after the retreat of their enemy, as unworthy of their increased power and greatness. Earthquakes at different times levelled many more; the overturned columns still lying on the ground exactly as they fell. Several of the larger temples suffered considerably through their conversion into Christian churches about the fifth century A.D., and later still into Turkish mosques. The Parthenon owes its present state to the untoward disaster which befell it in 1687, when, being used as a powder magazine by the Turks during their war with the Venetians, a shell exploded in its midst, destroying much of the walls and overthrowing many of the columns.

Lintel construction.

Unlike the earlier work, Hellenic Greek architecture is entirely of lintel construction; beams of stone or marble being employed, as in Egypt, to span openings. The arch must have been known and was probably used in domestic buildings, but it never found a place in the temples and other great architectural achievements. Its exclusion was deliberate, and was done for æsthetic reasons alone. The Greek artists realized that a mixture of two different methods of construction was a mistake, and was calculated to destroy the dignity and feeling of repose, which were their chief aims. They consequently chose that which in their opinion was the more

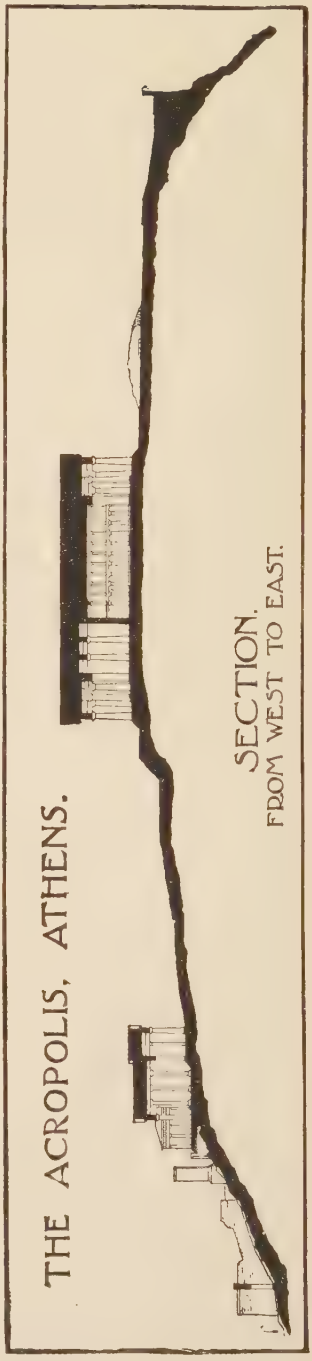


FIG. 40.
Middleton & Gardner (Hellenic Society).

beautiful, and at the same time the more likely to accomplish the ends they had in view.

The term "the Orders" is applied to the three divisions, called respectively Doric, Ionic, and Corinthian, into which Greek architecture is generally divided. It refers especially to the columns and entablatures, and their several parts. Each order possesses certain relative proportions between its parts, and also certain distinguishing mouldings and ornamentation more or less peculiar to itself. The size of a building makes no difference in its proportions and in the number of its parts. Thus, the Parthenon is four times the size of the Theseum, and yet not only are their proportions the same, but their columns have the same number of flutes, their capitals the same mouldings, and their entablatures the same divisions and subdivisions. In no other style of architecture could this arrangement be applied with any chance of success. If it were attempted, similar divisions in one building would appear too large and too few, and in another they would be too small and too many. Westminster Abbey a quarter full size would be a toy. The "Orders."

The Doric and Ionic are the earliest and most important of the orders; the Corinthian was originated later, possibly not before the fourth century B.C. The Doric order was employed principally in Greece, in the adjacent islands, and in the Dorian colonies of Magna Græcia (Southern Italy) and Sicily. The most important remains of the Ionic order are in the Greek cities of Asia Minor, especially in Ionia. The Doric and Ionic were used simultaneously in Greece for centuries, sometimes in buildings side by side, like the Parthenon and Erechtheum, and often in one and the same building. In the latter case, the Doric was employed for the exterior, for which its massive proportions rendered it especially suitable, and the more slender Ionic for the interior. This is the method followed in the propylæa at Athens, and in the temple of Apollo at Bassæ. In the Parthenon, however, and in other buildings, the inside as well as the outside columns are Doric. Sometimes in late work one order was placed above another, as in the Stoa of Attalus at Athens (B.C. 150), where the lower storey is Doric, and the upper one Ionic; but this is more characteristic of Roman work than of Greek.[1]

[1] The Greeks never used the column of one order with the cornice of another, but the Romans were not so particular, and in Græco-Roman colonies, such as Pompeii, greater laxity prevailed, and many instances of admixture occur.

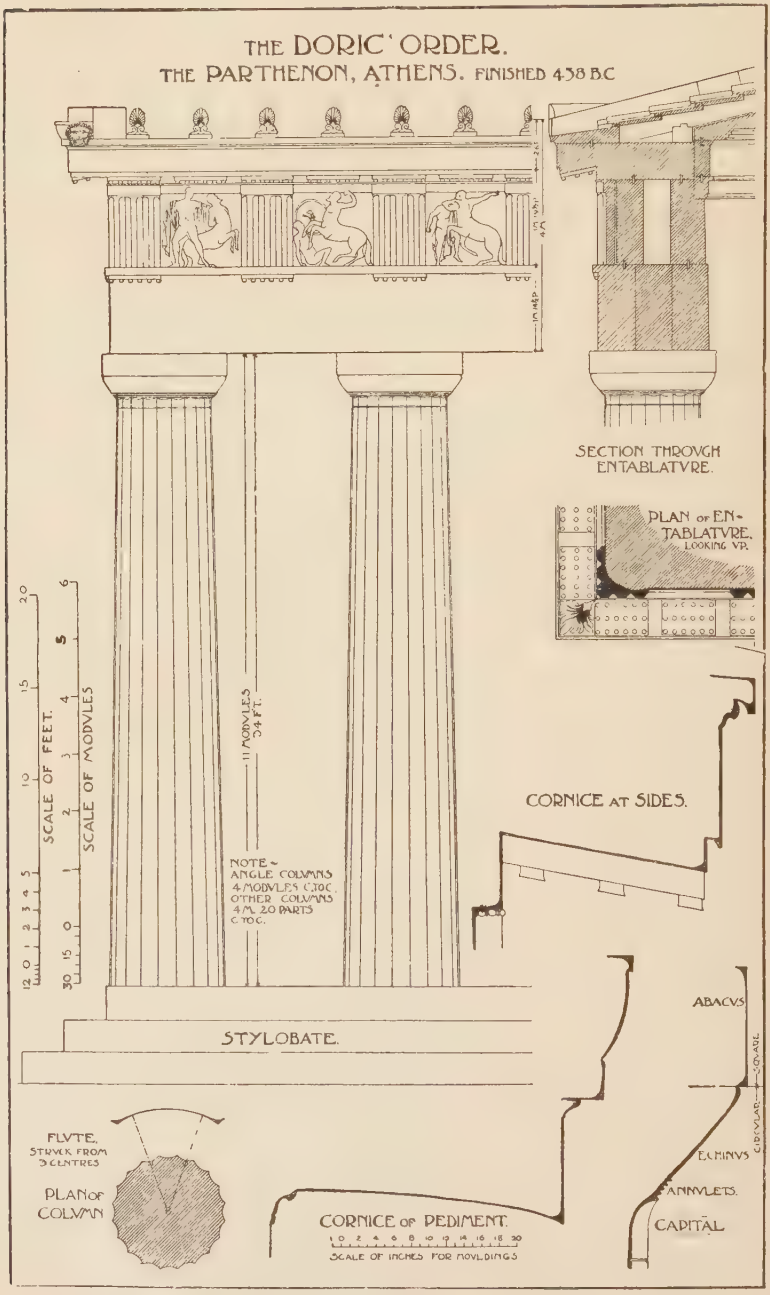

THE DORIC ORDER.
THE PARTHENON, ATHENS. FINISHED 438 B.C.
SECTION THROUGH ENTABLATVRE.
PLAN OF ENTABLATVRE. LOOKING VP.
CORNICE AT SIDES.
SCALE OF FEET.
SCALE OF MODVLES
11 MODVLES 34 FT.
NOTE.- ANGLE COLVMNS 4 MODVLES C.TO.C. OTHER COLVMNS 4 M. 20 PARTS C.TO.C.
STYLOBATE.
ABACVS
ECHINVS
ANNVLETS.
CAPITAL
FLVTE, STRVCK FROM 3 CENTRES
PLAN OF COLVMN
CORNICE OF PEDIMENT.
SCALE OF INCHES FOR MOVLDINGS

FIG. 41.

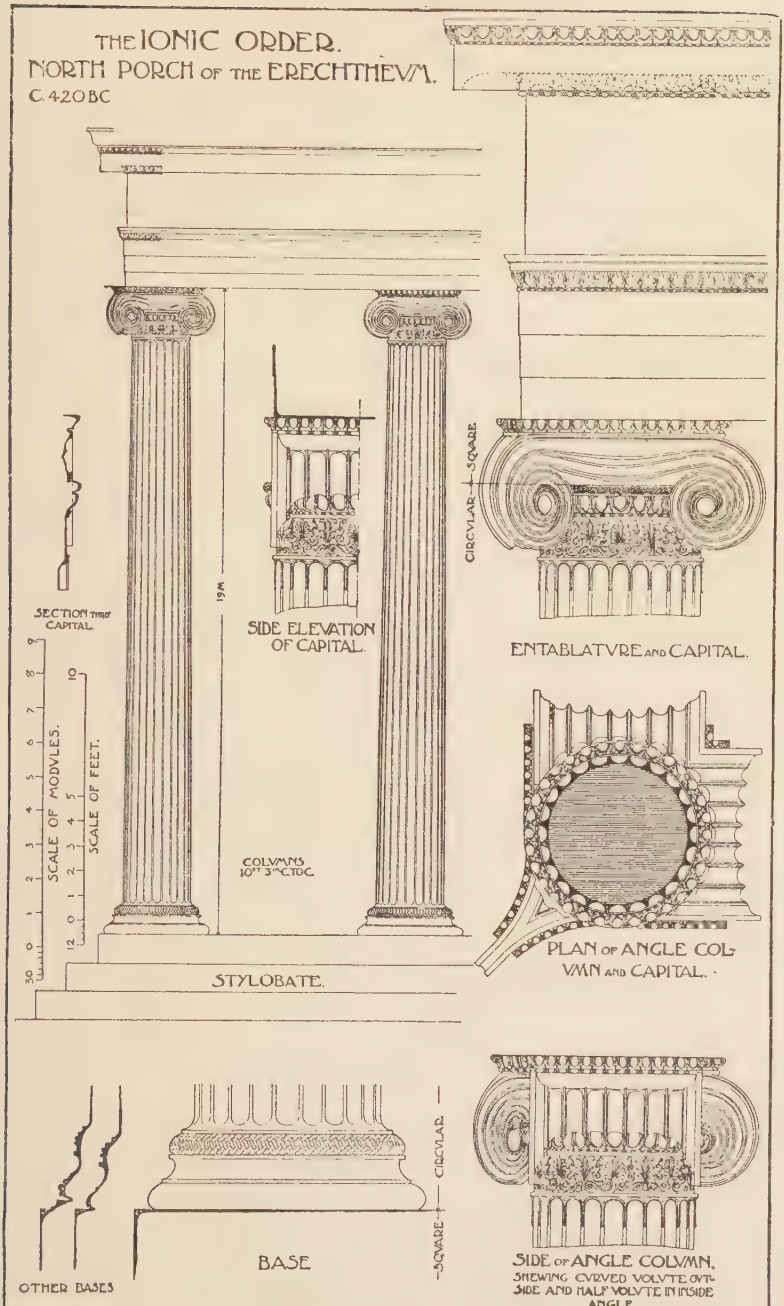

THE IONIC ORDER.
NORTH PORCH OF THE ERECHTHEVM.
C. 420 BC
SECTION THRO' CAPITAL.
SIDE ELEVATION OF CAPITAL.
CIRCVLAR
SQVARE
ENTABLATVRE AND CAPITAL.
SCALE OF MODVLES.
SCALE OF FEET.
COLVMNS 10" 3" C. TO C.
PLAN OF ANGLE COLVMN AND CAPITAL.
STYLOBATE.
OTHER BASES
BASE
CIRCVLAR
SQVARE
SIDE OF ANGLE COLVMN, SHEWING CVRVED VOLVTE OVTSIDE AND HALF VOLVTE IN INSIDE ANGLE.

FIG. 42.

Doric order.

The Doric was the order specially favoured by the Greeks; the one on which they lavished the most care, and which they employed for nearly all their big temples, except those in Asia Minor. It is by far the most massive of the three orders, and yet it is distinguished by a delicacy and refinement which the others, beautiful though they are, cannot lay claim to. The columns, although so sturdy, are close together. They are without bases, as their proportions rendered these unnecessary, and, like all Greek columns, they are fluted.[1] Flutes are necessary in the dazzling sunshine of Greece, otherwise the cylindrical nature of the column would be lost.[2] Doric flutes are shallow, are separated from one another by a sharp arris, and are generally twenty in number on each column.[3] The capitals are each in a single block, the only exception being in the temple of Jupiter at Girgenti, which is on such a gigantic scale that the abacus is in one piece, and the echinus and annulets below in another. The mouldings of the order are few; but all the curves are extremely subtle, and must have been drawn by hand, the only way by which satisfactory details can be produced.[4] They were, with unimportant exceptions, left uncarved, but were painted with enrichments similar to those which were carved on the mouldings in the other orders. The principal features in the entablature are the triglyphs and metopes in the frieze, and the mutules or slabs under the projecting upper members of the cornice. A triglyph comes over the centre of each column, and also over each space between columns; except at the angles, where, owing to the columns being closer, the outside triglyph is placed at the extreme end of the frieze, and is not central with the column below. The mutules are so close together that they almost touch one another, and on their underside are guttæ, or drops. The cornice of the pediment has an extra top member, which rises above the roof to prevent wet running down the face of the entablature. But the chief glory of the Doric order, apart from its perfect proportions, is its sculpture. The metopes were often sculptured, the pediments

[1] See Fig. 41. The Greek fluted column is probably the result of the same process of natural evolution as the somewhat similar Egyptian columns at Beni-Hasan. This is more likely than the theory that the one was derived from the other.

[2] The carvings on Egyptian columns possess the same value.

[3] There are, however, exceptions to this: the columns of the temples at Ægina and Sunium have only sixteen, whereas those of the temple of Neptune at Pæstum, near Naples, have twenty-four.

[4] Pennethorne, in his "Geometry and Optics of Ancient Buildings," tries to prove that all the curves were worked out mathematically.

were filled with figures, and at the apex and corners of each pediment were bases (acroteria) for more figures or carved ornament. This happy blending of sculpture with an architecture which combines perfect proportion, great delicacy of detail, and intense refinement, has earned for this order its unrivalled position as the noblest of all architectural styles, ancient or modern.

Ionic.

The Ionic order (Figs. 42, 43) is lighter and more ornamented by carving, but it lacks the fine sculpture of the Doric. The frieze has neither triglyphs nor metopes, but is sometimes carved with a continuous band of figures. The columns are slender, and are widely spaced.[1] The flutes are deep, and are separated from one another by a narrow fillet. Twenty-four is the usual number; but some columns have more, as in the archaic temple of Diana at Ephesus. The capital with its large spirals, or volutes, which suggest an Eastern origin, is a distinguishing feature. The volutes only come in front and at the back, and are straight-faced, except in the case of angle columns, when the outside volutes are curved, with not very satisfactory results in most instances. Curved volutes are best managed in the capitals in the interior of the temple at Bassæ, Phigaleia, and in other similar ones in the Græco-Roman city of Pompeii. In some capitals the "eye" of the volute is sunk, and a jewel or piece of richly coloured marble was inserted. The slender proportions of Ionic columns necessitated bases which are often elaborately moulded and sometimes carved. All the members of the base are circular in plan; the Greeks did not, like the Romans, insert

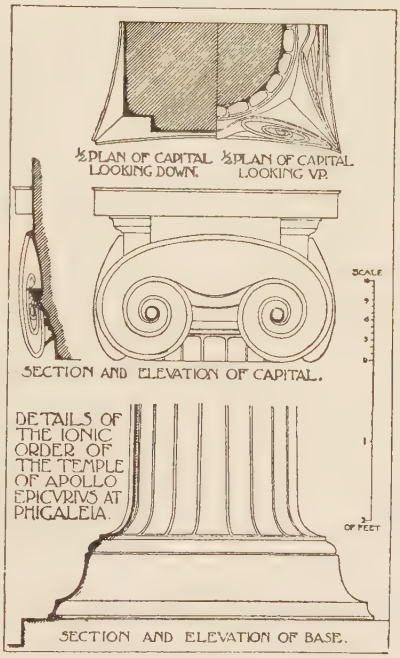

½ PLAN OF CAPITAL LOOKING DOWN.
½ PLAN OF CAPITAL LOOKING UP.
SCALE
SECTION AND ELEVATION OF CAPITAL.
DETAILS OF THE IONIC ORDER OF THE TEMPLE OF APOLLO EPICVRIVS AT PHIGALEIA.
OF FEET
SECTION AND ELEVATION OF BASE.

Fig. 43.

[1] Doric columns of the best period are about eleven modules high, Ionic ones about eighteen. The space between columns in Doric peristyles is less than three modules; in Ionic it is sometimes as much as five. The module is half the diameter of a column at its base.

under the mouldings a square slab, which is only in the way.[1] The Bassæ bases are different from the Attic ones. They are taller, and bear a close resemblance to the Persian bases at Persepolis.

Corinthian.

Greek remains of the Corinthian order are so scanty that its characteristics cannot be specified. So far as can be judged from the few small existing examples, its entablature was similar to the Ionic, and the shafts of its columns had the same proportions as those of that order. Its capital, however, was much deeper; and round the bell, or lower portion, were carved acanthus or other leaves. The most beautiful Greek Corinthian capital is from a circular building at Epidaurus, now destroyed. The Romans, with all their love for the order, never produced anything so exquisite. A much simpler form, with lotus and acanthus leaves alternating underneath a straight-sided abacus, was evidently common in Greece for many centuries. This was possibly the earliest type in use there; in which case its evolution from the bell-shaped capital of Egypt is understandable, and the theory that the leaves were originally of bronze sprigged on to a marble ground receives some confirmation.

Suggested wood origin.

The suggestion that Greek architecture, especially that of the Doric order, was copied from earlier buildings in wood is open to question. The triglyphs are said to represent the ends of beams which stretched across the interior; the metopes, the panels in between; the mutules, the projecting rafter feet; and the guttæ, the pins used to connect the different timbers. All this is hypothetical; the connecting links between existing examples and early buildings are lost, and it is therefore impossible to say how the evolution proceeded. It has already been pointed out, in the unconstructional Lycian tombs, that when workmen did copy timber construction and details in stone there is no doubt about it. To admit the assumption that Greek architecture was similarly copied is to destroy one of its greatest charms—the æsthetic logic which dominates every part. Columns were fluted so that their contours should tell, and so that the eye should be carried upwards, and their value as supports emphasized.[2] The stones forming the triglyphs were channelled because they also are important supports (see construction, p. 86), and the little guttæ

[1] There are, however, some instances of the slab in Greek temples at Priene and Teos, in Asia Minor.

[2] Flutes were not intended for "men to rest their spears in," as some old writers quaintly assert; if so, the Greeks designed very poor spear rests.

Fig. 44.—Corinthian Capital from Epidaurus.
(Now in Museum at Athens.)

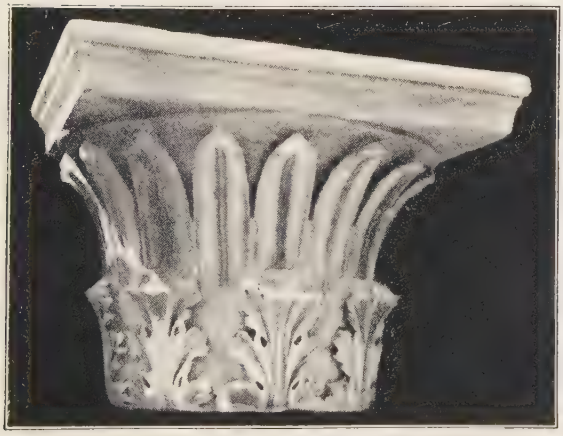


Fig. 45.—Corinthian Capital, Athens.

[*To face p.* 66.

under them were introduced to soften the strong transverse line formed by the architrave. The mutules in the cornice also had their uses, as without them the triglyphs would have finished too abruptly, and the projecting cornice have appeared to be without sufficient support. Bases were not given to columns because wooden posts required metal bands or shoes at the bottom to prevent their splitting or rotting, or because the architect wished to imitate the growth of a tree; but because an outspreading base gives an appearance of strength, which is necessary when a column is slender, as in the case of the Ionic, but which is unnecessary, and consequently dispensed with, in the more sturdy Doric. The Ionic order does in some respects suggest a timber origin. Its columns have the slender proportions of wood posts, the wide spaces between are what one would expect with wood beams, and its capital bears some resemblance to a bracket. But the proportions of a Doric column are not post-like, and there is no trace of a timber origin in its capital; if there were, as Viollet-le-duc has pointed out, the abacus would project on two sides only and not on all four. It is, of course, possible that some details were in the first instance suggested by work in another material, but, if so, they were modified; and their retention was due to architectural considerations alone, because the refined Greek artist felt that they were suitable to stone, that they had their uses, and that they helped to make his work beautiful.

Temple plans.

The plan of a Greek temple is very simple, and quite different from that of an Egyptian one, with its large entrance courts, its reception halls, and numerous small chambers. Temples are rectangular in plan, except a few which are circular. The smallest examples consist of merely a naos, or cella (with or without a doorway), with two columns at the entrance between antæ, or pilasters, and are called distyle-in-antis temples. Some have a portico in front, and others one at the back in addition; temples of the latter class being termed amphiprostyle. Larger examples have a peristyle, or range of columns, all round; but even in these the temple itself, as a rule, consists of merely one chamber, or naos. The Parthenon and a few others, however, have behind the naos another and smaller chamber, for which the use is not definitely known.[1] Temples with peristyles must have at

[1] In the case of the Parthenon, this was termed the Parthenon, and the naos was called the Hecatompedon (because it is 100 feet long). The space in front of the naos of temples is called the "pronaos," and that at the back the "opisthodomos."

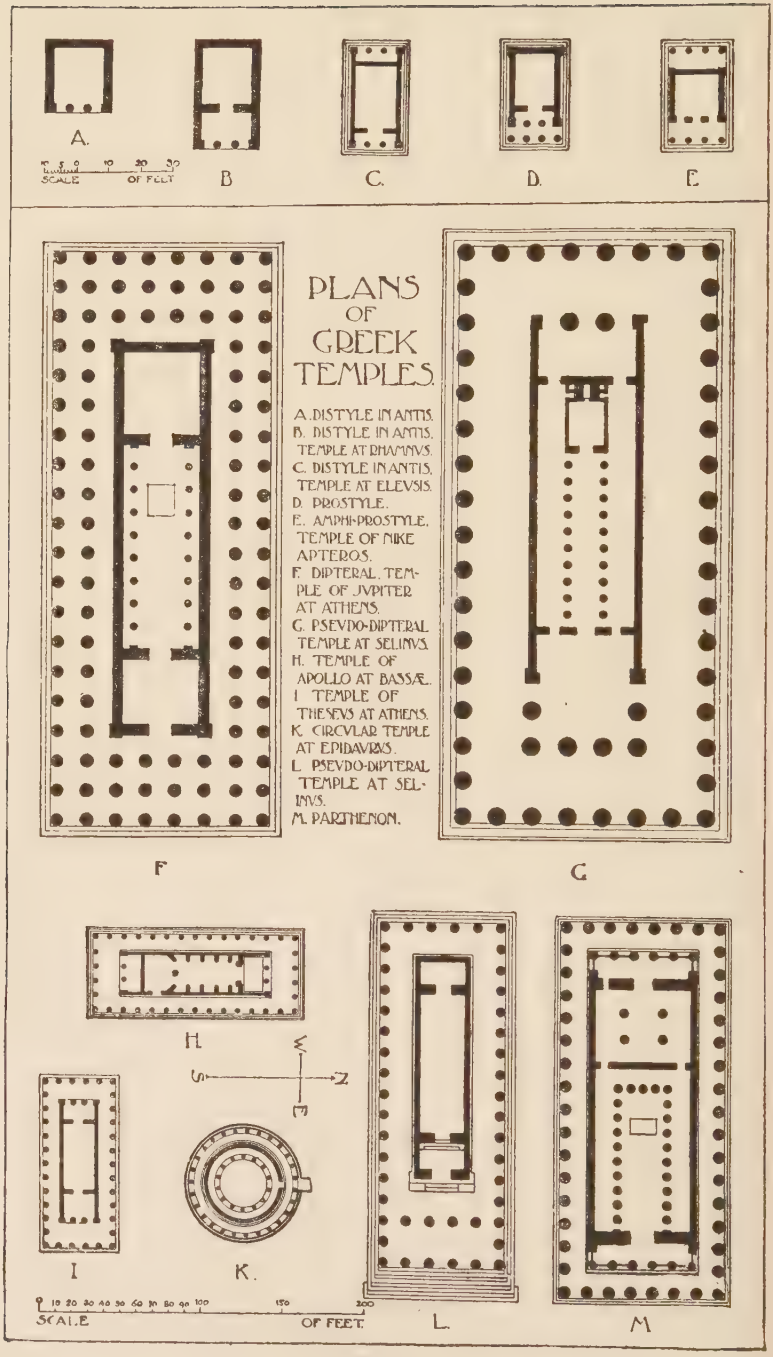

A.
SCALE
OF FEET
B
C.
D.
E
PLANS
OF
GREEK
TEMPLES.
A. DISTYLE IN ANTIS.
B. DISTYLE IN ANTIS. TEMPLE AT RHAMNVS.
C. DISTYLE IN ANTIS. TEMPLE AT ELEVSIS.
D. PROSTYLE.
E. AMPHI-PROSTYLE. TEMPLE OF NIKE APTEROS.
F. DIPTERAL. TEMPLE OF IVPITER AT ATHENS.
G. PSEVDO-DIPTERAL TEMPLE AT SELINVS.
H. TEMPLE OF APOLLO AT BASSÆ.
I. TEMPLE OF THESEVS AT ATHENS.
K. CIRCVLAR TEMPLE AT EPIDAVRVS.
L. PSEVDO-DIPTERAL TEMPLE AT SELINVS.
M. PARTHENON.
F
G
H.
I
K.
L.
M
SCALE
OF FEET.

Fig. 46.

least six columns in front, to allow of sufficient space for the naos between the columns at the sides, but may have eight or ten, and one example at Pæstum has nine. Temples surrounded by a double range of columns are called dipteral; and pseudo-dipteral when there is only one range, which, however, stands far away from the wall of the naos. There is no absolute rule for the number of columns on the flanks of a temple, but generally this is about double the number in front. Thus, the Parthenon, which is octastyle,[1] has seventeen columns at the sides, and most of the hexastyle temples have thirteen.[2] At each end of the Parthenon, behind the columns of the peristyle, there are six somewhat smaller columns which do not range exactly with the outer ones. The effect is excellent, and much better than in the dipteral and some of the pseudo-dipteral temples at Selinus, where the inner columns are the same size as those in front, and come immediately behind them.

The naos.

The naos contained the figure of the deity to whom the temple was dedicated. Some of these figures were of great size, and were of ivory and of wood cased with gold which was incised with ornament. The statue of Athena in the Parthenon, by Pheidias, was, with its pedestal, 39 feet high; and a similar one of Jupiter, by the same artist, stood in the temple at Olympia. When the width of a naos was too great to allow it to be spanned by single beams, internal columns were used which divided it into nave and aisles. The columns were two tiers in height, and supported the galleries over the aisles and the roof. Most of these columns have disappeared—they were removed in many cases when the temples were converted into churches—but in the temple of Neptune at Pæstum not only are many of the lower tier still standing, but some of the upper ones as well. In the temple at Bassæ there are no internal columns, but instead there are boldly projecting pilasters, rounded on the face, which are attached to the wall (Fig. 47). The interior of even the largest Greek temple is very small (about the size of an ordinary English parish

[1] Temples with four columns in front are called tetrastyle, with six columns hexastyle, with eight octastyle, and with ten decastyle.

[2] Of hexastyle temples, the Theseum, the temple of Jupiter at Olympia, the temples at Girgenti have thirteen; the temple at Ægina has twelve; the temples at Pæstum, Segesta, and Selinus have fourteen; the temple at Bassæ has fifteen; the Heræon at Olympia sixteen; and one temple at Selinus seventeen. All these are of the Doric order; the Ionic temples at Priene and Teos in Asia Minor have only eleven.

Name.	Town and country.	Description.[1]	Length of building.	Width of building.	Length of naos.	Width of naos.	Height of column.	Diameter of column at base.	Order.
			ft. ins.	ft. ins.	ft. ins.	ft. ins.	ft. ins.	ft. ins.	
Parthenon .	Athens, Greece	Octastyle	228 0	101 0	98 0	63 0	34 0	6 2	Doric
Theseum . .	„ „	Hexastyle	104 0	45 0	39 0	20 0	18 9	3 3	„
Nike Apteros	„ „	Tetrastyle	27 0	17 0	13 0	13 0	—	—	Ionic
Jupiter . .	„ „	Octastyle	354 0	134 0	125 0	47 6	55 0	6 4	Corinthian
Erechtheum .	„ „	Hexastyle	82 0	38 0	(uncertain)	32 0	21 9	2 3	Ionic
Apollo . . .	Bassæ „	„	125 0	48 0	56 3[1]	22 11	—	—	Doric
Jupiter . .	Ægina, Island	„	94 0	45 0	42 10	21 3	—	—	„
Jupiter . .	Olympia, Greece	„	210 0	91 0	91 0	46 0	36 0	7 3	„
Neptune . .	Pæstum, South Italy	„	197 0	79 0	87 6	36 0	29 0	6 8	„
Jupiter . .	Girgenti, Sicily	7 columns	362 0	174 0	(uncertain)	55 0[2]	70 0	14 0	„
Concord . .	„ „	Hexastyle	129 0	55 0	50 0	25 0	22 0	4 6	„
Apollo . . .	Selinus, „	Octastyle	364 0	167 0	149 6	59 0	53 6	11 0	„
Temple . .	„ „	Hexastyle	209 0	78 0	83 0	29 0	28 6	6 4	„
Diana . . .	Ephesus, Asia Minor	Octastyle	342 6	163 6	110 0	71 0	63 0	6 0	Ionic

[1] Including both cellæ.

[2] Central portion only.

church), and could not possibly have accommodated the great concourse of people, who, on days of high festival, came to participate in the celebrations. These took place outside, round the altar in

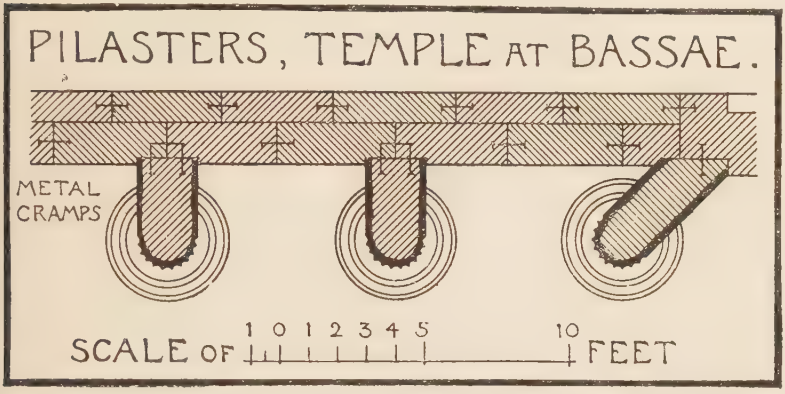


Fig. 47.

the courtyard; the entrance doors of the temple being thrown open to allow as many people as possible to see the shrine inside.

The above table gives the outside dimensions, measured along the top of the stylobate, of some of the best-known examples, together with the size of the naos of each, the heights of the columns, and the diameters at the base. It shows that the colonial examples were much larger than those in Greece itself, with the exception of the temple of Jupiter at Athens, which, however, was not finished until Roman times. The smallness of the cella in some is due to the greater proportionate width of the ambulatory. Table.

All temples, whether peripteral or not, are raised on a stylobate of steps, generally three in number. This forms a bold base, lifts the temple well above the ground, and prevents that appearance of its sinking into it which often happens when a building is plinthless. In large temples the steps are of considerable size, and smaller steps, or else inclined planes as in the temple of Jupiter at Olympia, were provided at the entrance for easy access.[1] The peristyle was a purely æsthetic arrangement, added to give additional beauty to the home of the shrine, and to proclaim the glory of the deity to the people. It supported the main entablature, but otherwise had no structural value. Stylobate.

[1] In the Parthenon the two lower steps are 20¼ and 20½ inches high respectively, and the top one is 21¾; why the last has an extra inch is not known (see Fig. 48).

Temples of the Doric Order in Greece.

When the Doric order commenced in Greece is not definitely known. It was probably used at a much earlier date than is ascribed to any existing example, and its evolution was, without doubt, very slow. Rapid architectural changes were then unknown, and centuries must have elapsed before it came to perfection.

Examples.

The oldest examples are the hexastyle Heræon at Olympia and the temple at Corinth, which date from the seventh or the sixth century B.C. Portions of the columns of the former exist, which, it has been proved, were after-substitutions for the original wooden posts, and the stone walls to a height of about 3 feet are still standing. Above this level the walls were of sun-dried brick, and naturally have perished. Seven columns of the temple at Corinth alone remain, and it is interesting to note that these are all monoliths. The hexastyle temple on the island of Ægina is in better preservation; but only twenty-two columns are still standing out of thirty-two, and portions of their architrave.[1] It dates from the first half of the fifth century B.C., and consequently was built about forty years before the best period. Notwithstanding this early date, its proportions are very similar to those of the Parthenon, and it also possesses some of the refinements found in that building (see p. 90). The great hexastyle temple of Jupiter at Olympia, built about 460 B.C., suffered severely from earthquakes in the first half of the sixth century A.D., and none of its columns are now standing. The octastyle temple dedicated to the same deity at Athens took longer to finish than any other known building. Commenced about B.C. 540, in the Doric order, by Pisistratus, and continued by his sons, work was abandoned for centuries, until about B.C. 174, Antiochus Epiphanes commissioned Cossutius, a Roman architect, to prepare a design for its completion. The work was continued under Augustus, more than a century later, and finally finished under Hadrian, 130 A.D. The marble columns, with their Corinthian capitals, were probably designed by Cossutius. The temple is placed on an immense platform, which at one corner is raised many feet above the ground. The finest of all the Doric temples is the Parthenon at Athens, which was

[1] Cockerell claimed that this temple was dedicated to Jupiter Panhellenius; other archæologists dedicate it to Athena, but the latest theory is that the honour should be accorded to the goddess Aphæa.

EAST PORTICO OF THE PARTHENON SHOWN IN SECTION

Reproduced by permission from "The Architect."

FIG. 48.

[*To face p.* 72.

commenced about 454 B.C. and dedicated to Athena in the year 438 B.C. It occupies a commanding position on the south side of the Acropolis. The architects were Ictinus and Callicrates, and the famous sculpture which adorned it was executed by Pheidias, or under his direction. The temple, ruined as it is, and shorn of nearly all its sculpture, is still extremely impressive, owing to the admirable proportions which especially distinguish it. These, after all, constitute a building's chief claim to immortality, as, although accessories can help, they can never make a fine work of architecture; and this fact is sometimes overlooked by critics, who expend their admiration on detail and overlook more important architectural essentials.[1] The peculiarities in the plan of the Parthenon have already been referred to; its construction, decoration, method of lighting, and the refinements introduced to correct optical illusions, which are found in this and other temples of the best period, will be fully described in the next chapter. Alongside the Parthenon, between it and the Erechtheum, are the foundations of an earlier Doric temple, also dedicated to Athena, which was destroyed by the Persians. Portions of its entablature and columns can still be seen built into the south wall of the Acropolis.

Similar to the Parthenon in proportion, and possessing many of the same refinements, but very different in size, is the small hexastyle temple, known as the Theseum, which stands on the low ground to the north-west of the Acropolis. Like the Parthenon, it was converted into a Christian church in the sixth century A.D., when an apse was thrown out at the east end. The opening made for this is now walled up, but portions of the capitals of the jambs, from which sprang the Byzantine arch, still exist. Owing to various causes, the Theseum is in a better state of preservation than any other Greek temple. The sculpture in the pediments has entirely disappeared, and the carved figures in the metopes at the east end—the only ones which were carved—are much

[1] In the British Museum Catalogue, it is stated (p. 92) that, "The architect was Ictinos, but the sculptured decorations and *probably the design of the temple* were planned and executed under the superintendence of Pheidias." This statement contains a contradiction. If the latter part is true—but, before believing it, one would like to know what authority there is for it—Pheidias was the architect, as only the architect can design and superintend the erection of a building. The description placed on the casts of sculpture from the pediment of the Parthenon in the South Kensington Museum is similar: "The Parthenon was erected under the superintendence of Pheidias."

destroyed; but the building, otherwise, has suffered very little, at least externally. Its date is somewhat uncertain, but it was probably built after the Parthenon.

The very beautiful hexastyle temple at Bassæ, near Phigaleia, in Arcadia, built by Ictinus, the architect of the Parthenon, and dedicated to Apollo Epicurius, runs north and south instead of east and west. The temple consists of a large outer chamber which was top lighted, and a smaller inner chamber which contained the statue of the deity. Against the walls of the larger chamber are the round-faced pilasters with Ionic capitals, already mentioned, and above them ran a fine frieze, which will be referred to later. The smaller chamber has a doorway in the side wall facing east, thus giving to this, the naos, its usual orientation. (Fig. 46 H).

Doric Temples in the Colonies.

The many Doric temples in Magna Græcia and Sicily are of the greatest interest; in fact they are, in some respects, more valuable than those of Greece, as they are generally in a better state of preservation, and are also mostly earlier in date. The workmanship, however, is not, as a rule, equal to that of the mother country. At Pæstum, near Naples, there are three, of which the hexastyle one dedicated to Neptune is the largest and best. All the external columns (thirty-six in number) are standing, and many of the interior, including some of the upper tier. This is the only Greek temple in which any of the latter remain in position. Alongside it is another temple, the peculiarity of which is that it has one single row of columns down the centre which divides it into two equal parts, and, in consequence, the columns at each end are nine in number.

Sicilian temples.

In Sicily, the principal temples are at Selinus (Selinunte), Girgenti (Greek Acragas, Roman Agrigentum), Segesta, and Syracuse. The Selinuntian examples are all in ruins; some were never even completed, owing to the destruction of the city by the Carthaginians in B.C. 409. On the Acropolis, side by side, were four large hexastyle temples and a smaller tetrastyle one, and in another part of the town are the remains of three others, of which one, an octastyle, is the largest Greek temple known. These are of different dates; two of the former group were probably commenced in the seventh century B.C., the others

Photo: Alinari.

FIG. 49.—INTERIOR OF TEMPLE AT PÆSTUM, S. ITALY, SHOWING INTERNAL COLUMNS.

[*To face p.* 74.

belong to the sixth and fifth centuries B.C. At Girgenti there are two hexastyle temples, known respectively as of Juno and of Concord, both of the fifth century B.C. The latter is exceptionally well preserved; the thirty-four columns which form the peristyle are standing, and so are the walls behind, which are pierced with arched openings made when the building was converted into a church. Neither of these temples ever had any internal columns in the naos, as the narrow width, 25 feet, rendered them unnecessary. The great temple of Jupiter, commenced by Theron about 480 B.C., but never finished, owing to the Carthaginian invasion, has attached columns instead of an external peristyle, and in this

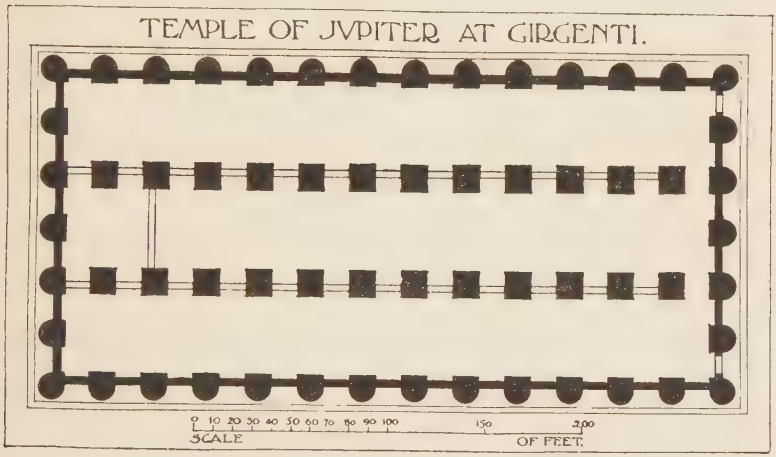


FIG. 50.

respect differs from all other known Greek examples. It is in so ruined a state that it is impossible to make out its complete design with any certainty. It is possible that the external wall to which the columns are attached did not extend the full height of the building, but formed merely a low screen, as in some of the fronts of Ptolemaic Egyptian temples (see pp. 18, 19), the space above the screen, between the columns, being left open for light. Somewhere about the building were many gigantic male figures, or Telemones, carved in stone. One of these has been reconstructed from existing fragments, and measures 26 feet high. The generally accepted theory is that these were placed inside, either on or in front of the divisional walls and immediately under the ends of the beams of the ceiling. A recent suggestion, however, is that they really came

outside, below the entablature and between the attached columns.[1] The modelling of the figures is very vigorous, and suggests that, whatever their position, they were intended to be seen from afar. The remains of the other temples at Girgenti are unimportant, but the little so-called Tomb of Theron, with its Ionic pilasters and capitals and its Doric entablature, is interesting as an example of the mixture of two orders. It is probably much later in date than the temples. The hexastyle temple at Segesta was never completely finished, and the flutes of the columns are not worked, but it is otherwise in a good state of preservation, and all the columns and the pediments remain. At Syracuse, an old Doric temple, which was first converted into a church, and afterwards into a mosque by the Saracens, is now the cathedral. Most of the columns and portions of the entablature of the old temple still remain *in sitû* embedded in the walls (see Fig. 108).

Other Buildings of the Doric Order in Greece.

Propylæa.

The most important of these are the propylæa, or entrance vestibules, of which the most beautiful forms the entrance to the Acropolis of Athens (see Figs. 39 and 40). This, although roofless, is still in a very good state of preservation, and there is no finer sight in Athens than it presents when lit up by the sun setting behind the mountains which fringe the Ægean sea. It was built by the architect Mnesicles, between the years B.C. 437 and 432, and is as perfect an example of Greek architecture as any of the great temples.[2] It was intended by Pericles to form the state entrance to the most sacred part of the city; as the Acropolis, long before its erection, had lost its original character as the citadel stronghold. In the centre is a portico of six Doric columns, which is flanked by two small protecting wings, each with its own Doric portico. Behind the central portico is the vestibule, divided in three by Ionic columns which supported the marble beams and ceiling, and contrasted well with the sturdier Doric columns of the exterior. The wall at the back of the vestibule is pierced by three wide openings and two smaller ones, and beyond on the Acropolis side is another portico similar to the outer one. The approach from the flat ground below was originally by a

[1] See Koldewey and Puckstein's "Die griechischen tempel in Unteritalien und Sicilien" (Berlin, 1899).

[2] Dr. Dörpfeld says it was never finished, owing to the Peloponnesian war, B.C. 431.

Photo : Rhomaïdes.

FIG. 51.—THE PROPYLÆA, ATHENS.

[*To face p. 76.*

zigzag road which led to the central portico, and was continued through the vestibule. In order to obtain sufficient width for it, the central columns of the outer and inner porticoes are farther apart than the others, and in the frieze over each central opening were two triglyphs and three metopes, instead of the customary one triglyph and two metopes. In Roman times, however, or perhaps before, the road was swept away, and the whole space between the wings, 73 feet wide, was filled by a magnificent flight of steps, which reached from the gateway at the bottom to the vestibule at the top. Architecturally this was a great improvement on the original plan. The front and back porticoes of the building were crowned by pediments, now destroyed, and the side porticoes and the walls of the wings by entablatures. The workmanship throughout is excellent, and, although portions are unfinished, the remains of colour on the mouldings of the beams and on other parts, show that the Greeks devoted as much care and attention to their secular buildings as they did to their temples. The whole is of Pentelic marble, except the top step of the stylobate and one or two other parts where slabs of Eleusinian marble are introduced with good effect.

Remains of other propylæa are at Sunium, Olympia, Epidaurus, wherever, in fact, a dignified entrance was necessary. At Eleusis, there are two, but these are somewhat late in date; the smaller one belonging to the middle of the first century B.C., and the larger one being a rebuilding of the time of Hadrian. This latter, like the propylæa at Athens, is Doric externally and Ionic internally; and the detail resembles that of the Athenian example, although the building was erected about 550 years later.

An interesting late example of Doric work is the tetrastyle gateway of Athena Archegetis at Athens, which formed the western entrance to the Roman market-place. The detail is somewhat coarse, but the proportions are good. This gateway dates from the first years of the Christian era, and, together with Hadrian's propylæa at Eleusis and a gateway of his at Athens, shows how well the old traditions lingered in Greece, centuries after the art had passed its zenith.

Ionic Temples in Greece.

Time has dealt even more severely with the temples of the Ionic order than with those of the Doric. In Greece very few

remain. There is the little temple of Athena Nike, or Nike Apteros, called also the temple of Wingless Victory, which occupies a commanding position on the Acropolis of Athens, alongside the Propylæa. It was built shortly before that building, the architect being Callicrates, the same who assisted Ictinus on the Parthenon. It was pulled down by the Turks when they fortified the Acropolis, but they luckily did not destroy its material, but used it for foundation on which to build one of their bastions. In the first half of the last century the buried blocks were discovered, and the temple was re-erected. In consequence, it appears now to be in a better state of preservation than other buildings which have really suffered less. It consists of a single cella, with four columns in front, and the same number at the back, the whole being raised on a stylobate (for plan, see Fig. 46).

The Erechtheum.

The only important temple of the order in Greece, and that owes its reputation more to its beauty of detail and irregularities in plan than to its size, is the Erechtheum. It differs in plan from other examples, partly because it housed three distinct shrines, partly because work on it was interrupted once if not twice, but principally because it is built on sloping ground, which obliged the entrances to be at different levels. The temple was probably commenced about 430 B.C., and it is known that it was still unfinished twenty years later. The beauty and richness of the detail are unusually great. Most of the mouldings are carved, and the variety in the carving is considerable, although the differences are not great. For instance, the carved "honeysuckle" bands under the capitals of the columns of the east portico are not exactly the same as those under the capitals of the north porch. The caryatid porch is one of those bold original experiments which end happily; and alone is sufficient, even though the rest of the building were commonplace, to give it exceptional distinction. The temple is not peripteral; but at the east end is a hexastyle portico, on the north side a large projecting porch of six columns, and on the south side is the caryatid porch. The columns of the northern porch are much wider apart than those of the eastern portico, showing that the Greeks recognized no arbitrary rules regarding the spacing of columns. The ground on the south side has been kept at the high level for the entire length of the temple, but on the north side it has been sunk, with the result that the west end and the pavement of the north porch

Photo: S. C. Atchley.

FIG. 52.—THE ERECHTHEUM, NORTH PORCH.

[*To face p. 78.*

are about 10 feet below the floor of the east portico. The floor of the caryatid porch is at the higher level, and from it a narrow staircase descends to the chamber at the west end. The interior is so completely gutted that it is impossible to say definitely what the original arrangement was, but it is evident that there were at least two, perhaps three, chambers on different levels. The chief difficulty is with the design of the west end. The present west wall stands some feet back from the corner of the north porch, about on a line with the caryatid porch, and over it are the bases of *attached* columns of later date. Between the columns were windows, which Penrose says were additions of the fourth century A.D. The cornice mouldings of the little caryatid porch at present have nothing to stop against, and project in front of the present west wall. This is hardly a satisfactory arrangement. Still more unsatisfactory, if the west wall is in its original position, must have been the effect on the north side, where the entablature and roof over the porch would have to return against the west wall, making a nasty little triangle.[1] I feel confident that in the original design—perhaps never carried out—a wall as high as the pavement level at the east end stood to the west of the present wall, on a line with the columns and pilasters of the north porch, that on the wall stood columns exactly the same height as those of the eastern portico, and that the roof was carried from east to west, over the present west wall, without a break. If this suggestion be correct, the entablature of the caryatid porch stopped against the south wall, which was brought forward, and the entablature of the north porch returned on the side of the massive pilaster at the north-west corner. It is difficult, no doubt, to prove this, but many points tend to show that the usually accepted restoration in which the western pediment comes over the existing west wall is open to doubt. The rest of the building is so perfect that one hesitates to accept a western arrangement which must have been architecturally bad.[2] The doorway under the

[1] This appears clearly in Revett's view (see Stuart and Revett's "Antiquities of Athens," vol. ii.), but in Inwood's suggested restoration ("Erechtheion at Athens," London, 1827), which is often reproduced, it does not show, as his view faces the other way.

[2] Since the above was written, and the accompanying drawing prepared, I have seen an article by Dr. Dörpfeld ("Der ursprüngliche plan des Erechtheion") in which he suggests that the temple was originally twice its present length, and that the existing west wall came in the centre. This suggestion would destroy entirely the curious double pilaster of the north porch, and the base moulding alongside it, both of which are undoubtedly Greek work and *in situ*.

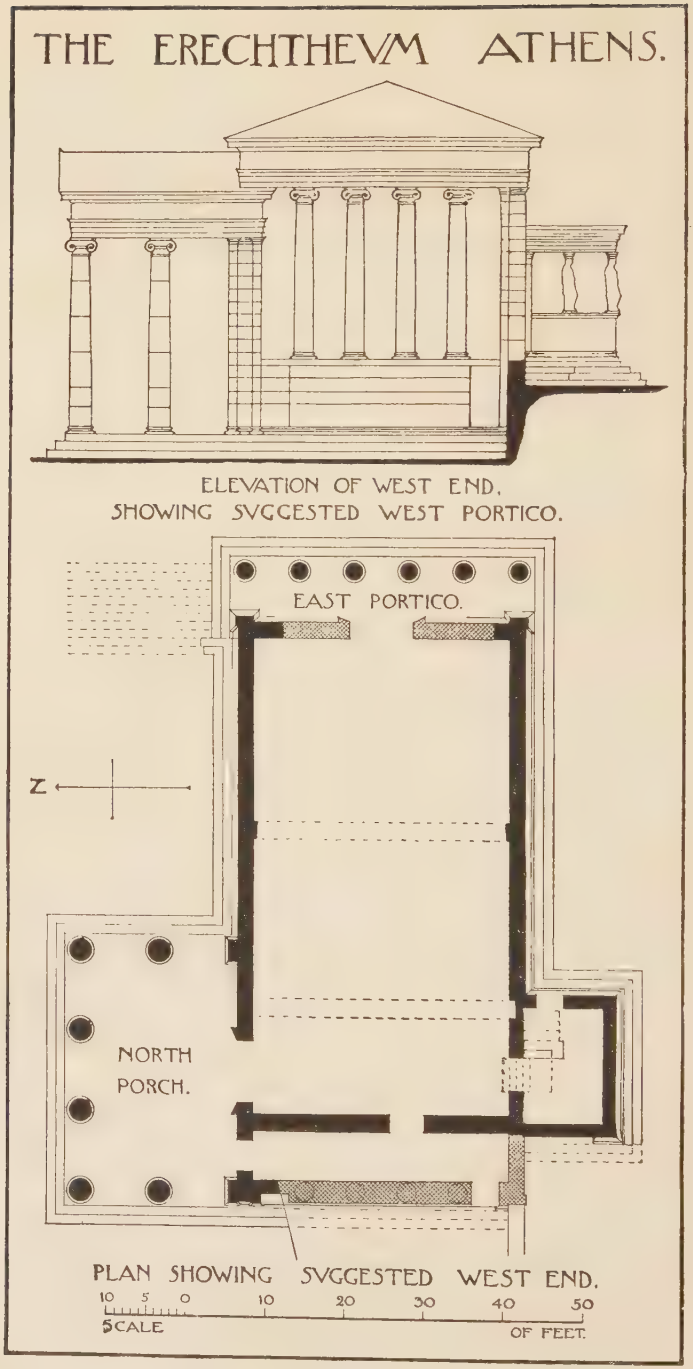

THE ERECHTHEVM ATHENS.
ELEVATION OF WEST END.
SHOWING SVGGESTED WEST PORTICO.
EAST PORTICO.
N
NORTH
PORCH.
PLAN SHOWING SVGGESTED WEST END.
10 5 0 10 20 30 40 50
SCALE
OF FEET.

Fig. 53.

north porch is often instanced as the most perfect Greek doorway in existence, and it deserves its reputation up to a certain point, but it is doubtful if the upper part is according to the original design. The carved rosettes of the architrave on the lintel have not sunk centres like those on the jambs, and the consoles and cornice appear to be later additions, or, at all events, not to be in their original positions.[1] The opening is 8·1 feet wide at the bottom and 7·6 feet wide at the top, the height being 15·4 feet, so the proportion is the usual one of 2 to 1.

Ionic temples in Asia Minor.

The Ionic temples in Asia Minor were much larger than those in Greece, but of these, once so numerous, few remains exist. The great decastyle temple of Apollo at Branchidæ, near Miletus, one of the largest in the world, has only two or three columns standing, and the still more famous temple of Diana, at Ephesus, which, although only octastyle, was nearly as large, has fared worse. Many buildings seem to have been erected successively on this site, but remains of only two have been discovered. The earlier was probably built in the sixth century B.C., and was burnt down two hundred years later, when the temple, of which remains are now in the Ephesus room of the British Museum, was built in its place. These remains consist of the lower drums of columns, round which are carved figures in high relief, and of the square bases on which the columns stood which are also sculptured. A fragment of the earlier temple shows that its columns were carved in the same way. The use of sculpture in these positions seems to have been peculiar to Asia Minor, at least no examples of it exist in work in Greece.[2]

Buildings of the Corinthian Order.

There are no temples in Greece of the Corinthian order (except the Jupiter Olympius at Athens of later date), and no buildings exist in which this order was used, which can be placed earlier than the year 340 B.C.; but it is impossible to believe that such beautiful capitals as those from the Tholus at Epidaurus (*c.* B.C. 340) (see Fig. 44), and the Choragic monument of Lysicrates at Athens (B.C. 335), had not ruder and less satisfactory prototypes. In the temple of Bassæ, a single Corinthian column

[1] The centres of the rosettes were probably sunk to receive coloured marbles.

[2] The Renaissance architects often carved figures and ornaments round the lower part of their columns, and may possibly have taken the idea from ancient classic examples which are now lost.

formerly stood between the two chambers (see Fig. 46), and if this were part of the original design it proves that the order was used in Greece a century before. The Corinthian order seems to have been a favourite with the Greeks for small fanciful buildings and for interiors. The Philippeion at Olympia, a circular monument erected by Philip of Macedon (*c.* B.C. 338), which was surrounded externally by a peristyle of Ionic columns, had Corinthian half-columns inside. In the Tholus at Epidaurus, a circular temple about 68 feet in diameter, an external Doric peristyle enclosed a circle of fourteen Corinthian columns (see Fig. 46 K). The remains of these are very scanty, but the Choragic monument of Lysicrates, at Athens, the best known of small Greek secular buildings, is in good preservation. Erected by Lysicrates to commemorate the success of his company in the Choric dances held in honour of Dionysus, it consists of a square base of stone, on top of which is a circular pedestal of Pentelic marble, 21 feet high, with six attached half-columns surrounding it. The cornice and domed top are in one solid slab of marble, and the architrave and frieze are cut out of another (Fig. 54). Another small building, known as the Tower of the Winds, at Athens, was built about B.C. 100 by Andronicus Cyrrhestes, and is octagonal in plan. It stands near the Roman Forum, at the opposite end to the gateway of Athena Archegetis, and was intended to act as a clock and a weather guide. On the top of the roof was a vane, and under the cornice runs a deep frieze of sculptured figures, representing the eight winds, whilst below are sun-dials carved on the wall. In the interior, cut in the marble floor, was a clepsydra, or water-clock, for telling the time if it were night, or if the sun were not shining. Similar clocks seem to have been common at the time of Augustus, as Vitruvius, the Roman writer, describes what he calls "water, or winter dials." Two doorways, one on the north-east, the other on the north-west side, protected by porches with Corinthian columns, gave access to the interior.

Photo: Rhomaides.

FIG. 54.—CHORAGIC MONUMENT OF LYSICRATES, ATHENS.

[*To face p.* 82.

CHAPTER V.

GREEK ARCHITECTURE (CONTINUED).

Lighting of Temples.

The method of lighting the temples has for many decades been a vexed question. Various suggestions, all ingenious and some plausible, have been made from time to time, but none is convincing except the simplest of all, namely, that light was admitted only through the great eastern doorway and the grating over the door. Artificial lighting by lamps no doubt was used at night, but in the daytime, when the doors could be left open, the flood of light which would enter would be more than sufficient to display the shrine and other works of art, and illumine the interior.[1] It is quite possible that in the Parthenon and other temples the doors were nearly always open, to allow the statues to be seen from the outside; the bronze screens between the columns, which will be referred to later, preventing ingress to the building except to authorized persons.

Some writers have insisted that the Parthenon and most of the other important temples were lighted by means of a hypæthron, or open skylight; but against this may be set the opinion of Dr. Dörpfeld who states that, although a few large dipteral temples were hypæthral, they were exceptions, and that the customary lighting was from the doorway alone. In most temples a big opening in the roof would have been objectionable from a practical as well as from an æsthetical point of view; the former, because the interior of the temple and its contents would be exposed to all weathers, which even in Greece can be severe; and the latter, because such an arrangement would

[1] The Parthenon doorway is 16 feet wide and 33 feet high; this area is much more than sufficient to light a building less than 100 feet long. The light is so much stronger in Greece and in southern Italy than in the north, that it is sometimes difficult to remember how small an opening is all that is necessary. Even under our atmospheric conditions, it is astonishing what a vast difference opening the western doors of a church can make.

destroy the skyline of the building entirely. A work of art, such as Pheidias's cryselephantine statue of Athena, would not have stood alternations of heat and cold, of dry and wet; the wood would have swollen, the ivory have cracked, the gold expanded and contracted, and the statue would have been ruined. Fergusson's suggestion that light was introduced through clerestories above the inner columns is ingenious, and possesses the advantages that the skyline would be preserved and the interior of the building protected; but in the absence of any proof whatsoever that such was the method adopted, the idea may be regarded as extremely improbable.[1]

Windows were seldom, if ever, used by the Greeks, except in domestic work. In the front wall of the chamber, known as the Pinacotheca, in the Propylæa at Athens, behind the portico on the north side, there are two, which are probably the only ones in existence which belong to the age of Pericles. Pilasters of very slight projection with moulded capitals come at the sides, and a plain band of Eleusinian marble forms the sill to each.

Proportions of Temples.

Many attempts have been made to show that all Greek temples were designed so that not only the main parts, but also the details and subordinate portions, should possess certain ratios to one another, which were carefully calculated and settled before the actual design was made. This theory has been most exhaustively worked out by the late Dr. Watkiss Lloyd, who accounts for the slight discrepancies which occur in the examples he selects for analysis, by the fact that the Greek architects, after making their calculations, allowed for foreshortening, optical illusions, etc.[2]

[1] See Fergusson's "History of Ancient and Mediæval Architecture," vol. i. p. 272 *et seq.*; or his "The Parthenon; an Essay on the Mode in which Light was introduced into Greek and Roman Temples" (London: 1883).

[2] See Appendix, Penrose's "Principles of Athenian Architecture." Dr. Watkiss Lloyd states that in the Parthenon the ratios used were such as differ five points from one another, 1–6, 2–7, 5–10, and so on—the higher the numbers, the nearer they approach to one another. The dimensions in feet of the Parthenon are: Length of front, 101; length of side, 228; height, 65, which give height to breadth, 9·14; breadth to length, 4·9; and height to length, 2·7. If this theory be a true one, there is still nothing to fix what ratio to use (different temples are stated to have had different ones), and no one has yet patented a ratio which can be applied to any building with a certainty that it shall be beautiful. A rough rule is sometimes given that the area of the columns in front shall equal the area of the entablature and pediment, or, in other words, the area of supports shall equal

Materials and Construction.

The materials used by the Greeks were marble, stone, wood, sun-dried bricks, and terra-cotta. Bronze was also used, but chiefly for decorative purposes. All the timber buildings have of course disappeared long ago, and the sun-dried bricks have once more become clay, but many ornaments in terra-cotta, such as ante-fixæ, are stored in museums, and prove that this material was employed to a considerable extent in certain positions. Materials.

Most of the temples in Greece are of marble, but many in the provinces are of stone. The best known marbles are Pentelic, from Mount Pentelicus, near Athens, used for all the Athenian temples and the Propylæa, a close-grained, dazzlingly white marble, which stands exposure well and weathers to a lovely colour; Hymettian, from Mount Hymettus, which is white, with greyish-blue streaks which rather spoil it (the temple at Sunium is built of it); Parian, from the island of Paros, used for sculpture in the temples of Sunium and Ægina, and for roofing tiles at the latter place and at Olympia, for which purpose it is well suited owing to its slight transparency; and Eleusinian, from Eleusis, a dark grey marble, employed with considerable effect as a foil to the white Pentelic in the Propylæa at Athens, in the frieze of the Erechtheum, and in the great Hall of the Mysteries at Eleusis. In the last, the contrast between the grey stylobate and paving of the portico and the white marble columns above is very striking.

The stone was generally limestone; sometimes of fine grain, but occasionally, as at Olympia, very shelly and coarse in texture. In order to obtain the fine mouldings and finish the Greeks delighted in, in all important positions it was covered with a very thin layer of marble-dust stucco, finished in such a way that no difference was apparent between a building so treated and one built entirely of marble. In the great temple of Jupiter at Olympia, in the temples of Corinth, Ægina, and Pæstum, and in the Sicilian examples at Selinus and Girgenti, remains of stucco still exist on capitals, columns, and other portions. Sometimes the stucco was only applied to the entablature and columns, and Marble stucco.

that of the portion supported, but no existing example works out exactly like this. In the same way, the theory that in the Doric order the area of intercolumniations equals that of the columns, and that in the Ionic order it is double, is true up to a certain point, but will not bear too close an analysis.

the walls of the naos were left untouched, in order to form a foil to the peristyle.

Construction.

Whether the walls are of stone or marble, they are built of big blocks, without mortar, and with very little bond. Stretchers only are used, but the stones are sometimes cramped with iron cramps, and in some thin walls at Olympia they are rebated so that one course can overlap another. The bottom course is always a very high one, about twice the height of the other courses, and consists of blocks placed on end in front, which do not, as a rule, bond with the stones behind. The arrangement is a somewhat unconstructional one, as it is placing an element of weakness at the very point where strength is most required. As a matter of fact, however, there was no danger of the walls giving, and bond was not really necessary, owing to the comparative smallness of the buildings, to the large size of the blocks, and to the fact that the walls were without openings, except for a doorway or two.[1] Columns are sometimes monolithic, as in the early example at Corinth, but are generally composed of drums, each the entire diameter of a column. These were hoisted into position by means of "ancones," or projecting blocks left on, which were afterwards dressed off.

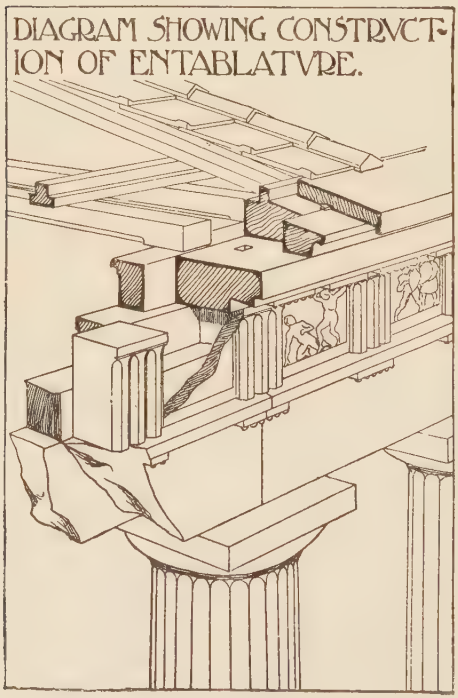
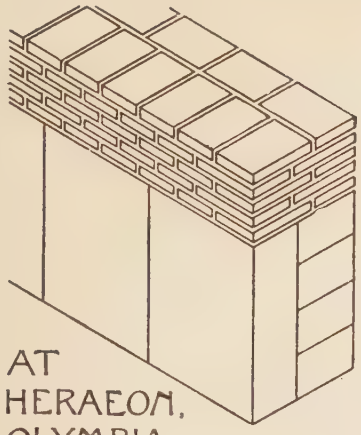


Fig. 55.
Viollet-le-duc (Librairies Imprimeries Reunies).

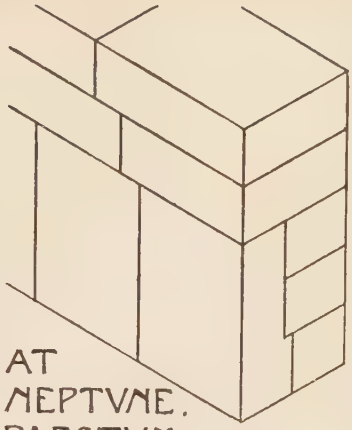
Entablature.

The architrave, in small buildings, consists of single stones,

[1] A possible origin of the orthostatæ, as this high bottom course is called, is that in temples built chiefly of brick, the bottom course of the wall was a deep one in stone. In the Heræon at Olympia only the stone orthostatæ remains.



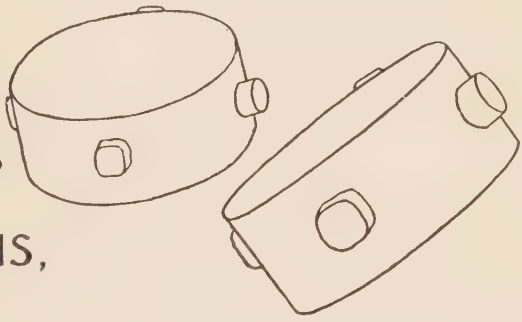
AT
HERAEON,
OLYMPIA.

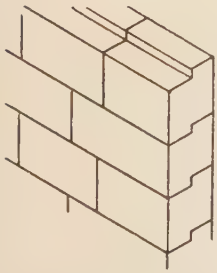


AT
NEPTVNE.
PAESTVM.

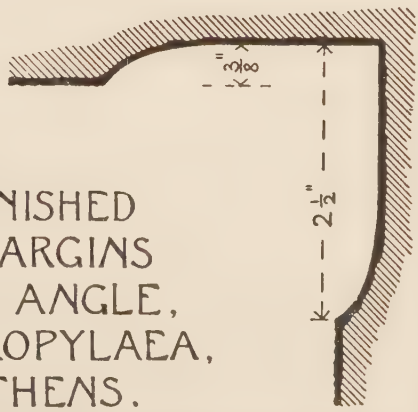
BOTTOM COVRSE (ORTHOSTATAE)

ANCONES
ON DRVMS
FROM
ACROPOLIS,
ATHENS.





REBATED
THIN WALL,
OLYMPIA.



FINISHED
MARGINS
IN ANGLE,
PROPYLAEA,
ATHENS.

FIG. 56.

which reach from centre to centre of the columns, but in large temples two or more beams are placed side by side; in the Parthenon there are three. In the Doric frieze, the triglyphs are the constructional stones which carry the greater part of the weight above, and consequently they bond well into the wall. The metopes carry no weight at all, and are merely thin slabs fixed like panels somewhat loosely behind the triglyphs, which are often slightly rebated to receive them. This method was adopted to prevent any danger of the carved metopes cracking if the building settled owing to earthquakes, or other causes.

Roofs, ceilings, and floors.

The roofs were of wood, and to this their destruction is due. On the rafters were laid tiles, either of marble or of terra-cotta, so designed that each alternate tile covered the joint between two tiles underneath, much in the same way as the semicircular tiles in common use in all Southern countries do to this day. The covering tiles were stopped at the eaves by antefixæ—*i.e.* upright slabs of marble, which were often carved—the idea for which was doubtless derived from the custom, still general, of tilting ordinary tiles at the eaves. In the temple at Ægina only the tiles over the cornices and pediments were marble, the rest were terra-cotta. In the temple at Bassæ, according to Cockerell, the "covering tile was wrought in one piece with the tile itself," an expensive but effective method. The ceilings of the external ambulatories were of marble, with deeply coffered panels (lacunaria), and those of the interiors were of similar design, but of wood richly painted and gilded. Many of the marble ceilings still exist. The one round the Theseum, of Parian marble, is in a very good state of preservation, but in design it is not so rich as those over the north and caryatid

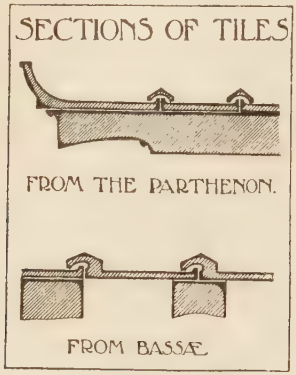


Fig. 57.

Fig. 58.

porches of the Erechtheum. The floors were of marble, even in temples which were otherwise of stone. The Parthenon floor is in big square slabs, a foot thick.

Workmanship.

In no other style of architecture has such care been taken in the workmanship, to ensure perfect finish and fine jointing, as in the Athenian buildings erected during the fifth century B.C.[1] In order to obtain a fine joint in the columns, a square hole was made in the middle of the bed of each drum, into which, according to Penrose, a wood block with a pin was inserted to form a centre, "by means of which one drum could be made to rotate upon the other." Round this hole was a circle of smooth stone, about 9 inches in diameter, and at the outer edge was another smooth surface, also about 9 inches wide, flush with the other. The drums consequently only touched one another at these points, the rest of the beds being slightly sunk. Equal care was taken with the joints in walls and floors. The slabs were not finished to the required face when laid, but about three-eighths of an inch was left on, which was dressed off afterwards. In the case of joints in walls, one side of each joint was slightly splayed. Many walls never had the final dressing, notably those of the Propylæa at Athens, and these show that it was customary to work narrow margins only to the finished face, sometimes merely at the top, bottom, and at the corners, sometimes round each separate stone, the result being either one large panel, or else a series of smaller panels. Many a wall looks all the better now for its panels, which relieve what might

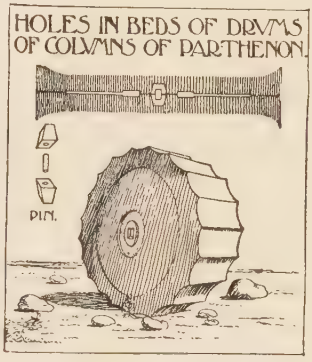


Fig. 59.

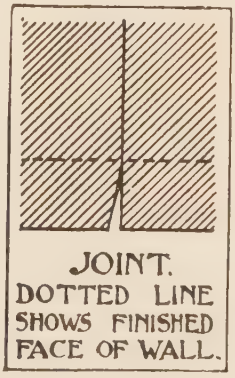


Fig. 60.

[1] Stuart, in his "Antiquities of Athens," records that some of the stones had actually grown together, being united "as firmly as though they had never been separate."

otherwise be too flat and even a surface; but the Athenians loved colour, and when walls were intended to be painted, as doubtless most of these were, an absolutely smooth face would be a necessity.[1]

The following excellent account of the procedure adopted in the finishing of a temple is taken from Penrose's "Athenian Architecture:"—

"The method followed in building a temple was, first to construct the pavement and steps with their own surfaces rough, as seen at Segesta and other places, providing only a narrow finished surface in the internal angles of the steps, and a plane sunk surface to receive the lower drums of the columns, where an outline was traced on the pavement to correspond with the flutes, which were executed at the foot of the column itself for a very small height. The next step was to build the column in plain cylindrical drums, smoothing off the ancones as they were built; the capitals only (which in Doric were turned) and that portion of the flutes which intervenes between the neck of the column and the echinus being of finished work. After these the architraves and other parts of the entablature were built with fine beds and joints, but with their surfaces still left rough. When the whole construction was thus completed, the finishing would naturally begin at the top. Such surfaces and mouldings as were hitherto left rough would be smoothed, polished, and in those cases where pigment was to be applied, painted. The flutes of the columns would be formed as the scaffold and workmen descended (the small portion of the fluting which had been prepared below, and that already executed at the neck serving as fixed points to guide the curved line which formed the entasis of the columns),[2] and the last part smoothed and polished would be the stylobate. It is an interesting fact that examples are preserved to us in all these stages."

Refinements.

Great as was the care taken to obtain perfect technical workmanship and finish, greater still was the ingenuity displayed to ensure perfection of proportion. Refinements were introduced,

[1] The Romans deliberately left portions of their stones raised, because they liked the broken surface which the panels gave, and the custom has remained general ever since.

[2] It is interesting to note that this preliminary stage was copied by the Romans as a beauty, and has also been followed by some modern architects.

many of which are so delicate that their very existence was unsuspected half a century ago. The object of these was in some cases to prevent a hard mechanical appearance in a building, and in others to correct certain optical illusions. The most important are the diminution in the diameter of columns, the entasis of columns, their spacing, and the rise in the stylobate and entablature.

Diminution.

Columns in all styles, except the Gothic, taper from the bottom to the top, in order to prevent a feeling of top-heaviness which results when the diameter is the same throughout. The columns of the Doric order, owing partly to their greater sturdiness, and partly to the absence of bases, diminish to a greater proportionate extent than those of the Ionic. In the Parthenon the columns of the peristyle are 6 feet 2 inches wide at the bottom, and 4 feet 10 inches wide at the top immediately below the capital, a diminution of nearly one quarter in a height of 32 feet. In the north porch of the Erechtheum the columns diminish from 2 feet 9 inches to 2 feet 3 inches, in a height of 25 feet, which is less than one-fifth. In pilasters the diminution is less than in columns; sometimes there is none at all.

Spacing.

In Greek Doric temples the outside columns are always closer together than the intermediate ones. This gives that appearance of strength at the corners so important in architectural composition. In the Parthenon the average outside intercolumniation is 6 feet against 8 feet elsewhere. In addition, in many hexastyle examples of the order the other columns of the front are unequally spaced, the central intercolumniation being the widest. This is the case in the Heræon at Olympia and in some of the Sicilian temples, but not in any of the Athenian examples. An objection to it possibly was that it made the metopes of different widths, which might be a drawback when they contained sculpture. Otherwise there can be no doubt that it has a good effect, as when all spaces are equal, the centre one appears to be narrower than the others.[1]

Entasis.

The entasis is a convex outline given to columns so that their outline shall not appear concave; a result which happens

[1] In the Heræon the central intercolumniation is 8 feet, that on either side only 7 feet 6 inches. In the Ionic temples of Ephesus and Sardis, both in Asia Minor, this graduated spacing is very marked. At Ephesus the spaces measured from centre to centre of columns are: central space, 28 feet 8 inches; next space on each side, 23 feet 6 inches; then 20 feet 4 inches; the outside ones being 19 feet 4 inches.

when columns of any size are bounded by straight lines. In Greek columns the entasis is so slight that it was only noted in modern times; in Roman columns it is more pronounced. In the peristyle of the Parthenon the maximum curve is only two-thirds of an inch on each side, which is reached at a point about two-fifths of the height. In some small Greek buildings, such as the little temple of Nike at Athens, and in most of the Colonial examples, there is no entasis at all.

Rise.

The lines of the stylobate and entablature are often not straight, but rise towards the centre in a convex curve; because long lines when quite straight appear to "sag," or drop in the middle.[1] In the Parthenon the rise in the stylobate is about 3 inches on the front in a width of 101 feet, and about 4 inches on the side in a length of 228 feet. In the entablature the rise is similar. These curves also occur in the Theseum and in the Athenian Propylæa, but not in the temples at Bassæ and Ægina, nor in the Colonies. Delicate workmanship, such as was necessary for them, was too difficult to manage in the coarser stone of which these examples are built.

Minor refinements.

Some minor refinements which exist in the Parthenon and in a few other buildings are not actually apparent, although they make their influence felt when one is conscious of their existence. Angle columns are an inch or two wider than the others, as they stand out against the sky, and consequently appear rather less in diameter than they really are. All the columns incline inwards a trifle, and the faces of the architrave, frieze, tympanum of pediment, and stylobate all have a similar inward inclination. This helps to give that pyramidical appearance to the Parthenon, which is one of its most charming characteristics.[2]

Greek Sculpture.

Not only is Greek architecture the purest ever conceived, but it was enriched with the finest sculpture the world has ever seen. Architects will always remember with feelings of intense satisfaction that when Greek art was at its zenith the two oldest of the arts were not divorced from one another, but were used

[1] The "camber," or slight rise in an ordinary "straight" brick arch, is given to prevent this appearance of sagging.

[2] Gothic towers and buttresses often have this inward inclination, called in these instances "batter."

together with the happiest results. Fine though many Greek figures of later date are, which were not parts of an architectural composition, none can compare in beauty, grace, and vigour with those that filled the friezes and pediments of the Parthenon, the work of Pheidias and his contemporaries. Somewhat earlier in date than these are the spirited groups in the pediments of the temple at Ægina, which were discovered by Cockerell in 1811. Although probably not more than fifty years separated the two buildings, the greater freedom of the Athenian work proclaims the immense advance which had taken place in the art during that half century.[1] Contemporary with the Ægina marbles are some of the metopes from Sicilian temples, now in the museum at Palermo, which also possess considerable merit.

In the Parthenon the metope carvings are in very high relief, in some cases the figures being almost detached from the background; whilst the groups which filled the pediments are entirely in the round. The carving in the famous continuous frieze of the same building which ran along the top of the side walls of the naos externally, and across the ends above the columns of the pronaos and posticum, is much flatter. The height of the relief is about $2\frac{1}{4}$ inches at the top, but only about half that at the bottom of the frieze. The slight projection of the figures is all the more remarkable since the sun's rays could never have reached the work, as the ceiling of the ambulatory came immediately above it and effectually shadowed it. The only light it received was reflected light; and although reflected light in Athens and in England are two very different things, this must always have been subdued. The portion of the frieze which remains *in situ* is not seen to advantage, as, owing to the roofless state of the temple, the light is not only too strong, but it also comes from above, and the shadows consequently fall the wrong way. The frieze is generally regarded as representing the Panathenaic procession which took place in Athens every four years in honour of the goddess Athena Polias. It is of Pentelic marble, 3 feet 4 inches high, and its total length originally was 523 feet.

Other friezes.

The sculptured frieze which still exists on the Theseum, above the columns *in antis* at each end, is bolder in relief; and so is the one which decorated the interior of the temple at Bassæ, which is now in the British Museum. The latter ran round

[1] The originals from Ægina are at Munich, but full-size casts are in the British Museum.

the outer chamber (see Fig. 46 H), above the rounded pilasters and was lighted by a large hypæthron. The frieze of the Erechtheum differs from all others in its method of execution. The figures, of which only fragments remain, were carved separately in white Pentelic marble, and were then attached by bronze pins to the gray Eleusinian marble of which the frieze proper was composed. The mixture of materials and the applied character of the sculpture appear a bit startling; but the Greeks always coloured their backgrounds, and this is merely an instance of a contrast being obtained without the aid of artificial colouring.

Caryatid figures.

The figures composing the caryatid porch of the Erechtheum are splendid examples of the sculptor's art at the best period (Fig. 61). Objections have been raised that figures should never be used as supports in a building; but in this instance the weight over is so slight, only that of the entablature and coffered ceiling of the porch, and the detail of the entablature is so delicate and rich and so perfectly in scale and harmony with the figures below, that, although theoretically the design may be a mistake, one is heartily thankful to the artist who had the courage to ignore architectural rules. The figures are admirably disposed to act as supports; the outer legs straight, the knees of the inner legs bent; and the folds of the drapery are especially arranged to heighten the structural effect. In the Museum on the Acropolis at Athens are some figures, draped with the effective, crisp, conventional folds which are characteristic of the sculpture before the time of Pheidias, but whether they formed part of an architectural composition or stood detached is uncertain. Several retain traces of their ancient colouring; chiefly borders on the drapery painted in blue, green, red, and yellow, of very effective design, the "fret" pattern being mainly used.

One important lesson to be learnt from Greek architecture especially of the Doric order, is that sculpture on a building is most suitable and effective when framed in. This appears conspicuously in the metopes of the Doric frieze, which are flanked by triglyphs, and in the tympana of the pediments with their surrounding projecting mouldings. Gothic art, with its rows of figures enclosed in canopied niches, teaches the same lesson. It is well to remember this, for so long as the lines of the sculpture agree, and do not clash with the architectural lines, figure sculpture will always be the most suitable and noblest decoration a building can have.

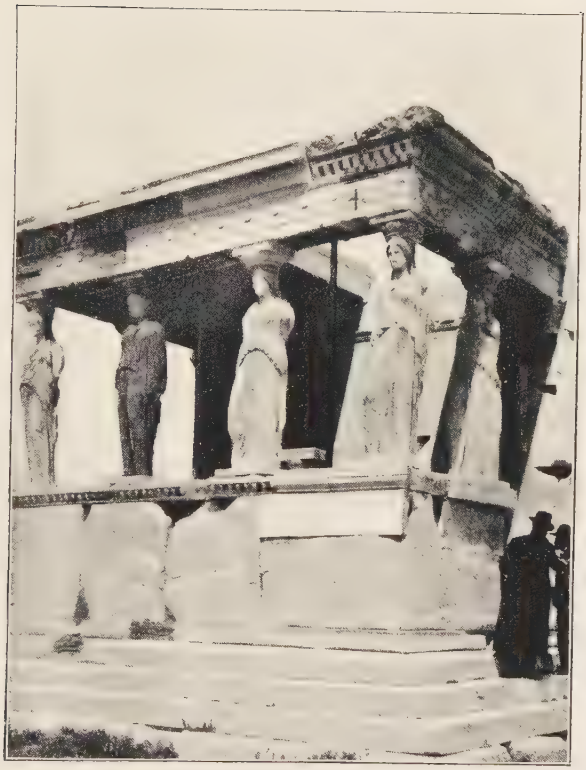


Fig. 61.—The Caryatid Porch of the Erechtheum.

[*To face p.* 94.

Carving and decoration.

The carved and painted enrichments on the mouldings are as delicate as the mouldings themselves. Each moulding has its distinctive design. The echinus has the egg and dart and egg and tongue; the cyma reversa, the leaf and dart and leaf and tongue—all four being modified versions of the Egyptian lotus leaf; the astragal has the bead and fillet; and the torus, the guilloche. On the cyma recta is often carved the most elaborate of all the patterns, known as the anthemion, or honeysuckle, which, although chiefly used in the Ionic order, is also found in the Doric. This is also of Egyptian, or possibly Assyrian, descent, but is so improved and refined that it bears but slight resemblance to its prototypes (see Figs. 12, 21, 27, and 62).

The plant known as the "acanthus," which was represented with such grace and fidelity to nature, and yet with the slight conventions so necessary in architectural carving, is seldom met with on work executed before the fourth century B.C. Its beautiful leaf and stalk form the distinctive features of the capitals of the Corinthian order, and are carved with good effect on the brackets on the dome of the Lysicrates monument at Athens. The famous "fret" pattern is always on the flat, as any curve would destroy the angularity of the design, and is more often painted than carved. It is composed of squares, or of L-shape lines, and the combinations possible with these simple forms are endless.

Painted decoration.

The outlines of enrichments to be painted were generally first incised on the marble, terra-cotta, or stucco, as the case might be, so that the pigment could be quickly and correctly applied. The colours were green, blue, red, yellow, and brown, and wax was the medium usually employed. The durability of this method of painting is proved by the fact that well-defined traces of colour still exist on portions of the Parthenon, Propylæa, Erechtheum, and other buildings, which have been exposed to the weather for considerably over two thousand years. Not only were ornaments painted on mouldings, but colour was also freely applied to the backgrounds of metopes and friezes, to the triglyphs, and elsewhere, in order to emphasize the sculpture, or any other portions of the building to which the architect desired to give prominence. The columns and walls, even when built of the beautiful Pentelic marble, were in most cases waxed, or treated in some way to tone down the dazzling whiteness of the material. Figure pictures were painted on the walls of temples externally, and also, it is stated, on panels internally. The former are supposed to have been in honour

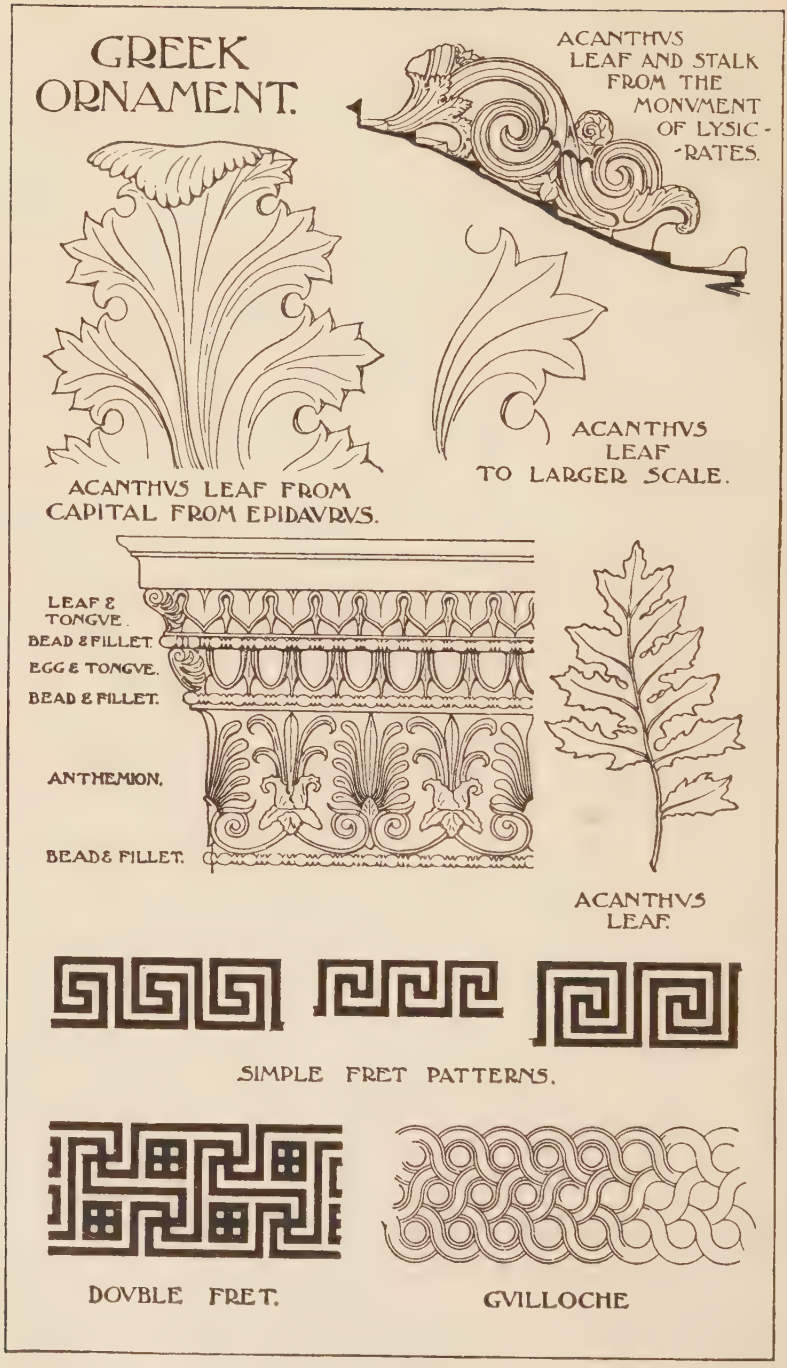

GREEK ORNAMENT.
ACANTHVS LEAF AND STALK FROM THE MONVMENT OF LYSIC-RATES.
ACANTHVS LEAF FROM CAPITAL FROM EPIDAVRVS.
ACANTHVS LEAF TO LARGER SCALE.
LEAF & TONGVE.
BEAD & FILLET.
EGG & TONGVE.
BEAD & FILLET.
ANTHEMION.
BEAD & FILLET.
ACANTHVS LEAF.
SIMPLE FRET PATTERNS.
DOVBLE FRET.
GVILLOCHE

Fig. 62.

of the deity to whom the temple was dedicated, and were either in panels divided from one another by painted mouldings, or else formed a continuous band round the wall. In peripteral buildings such a band would provide a delightful background to the columns in front, and the columns would divide the painting into ever-changing pictures. Materials of different colours were sometimes used to form contrasts, as in the frieze of the Erechtheum, and bronze and gilding were also applied, although to what extent is unknown; probably much more than was formerly supposed.[1] In fact, Greek temples, like Gothic cathedrals, were at one time as rich in colour as different materials and painted decoration could make them. Temple and cathedral alike have suffered; but in each case enough remains to show the character of the original scheme.

Bronze screens.

Open-work screens of bronze were fixed between the external columns of the temples, and were also placed in some cases between the columns inside. In the Parthenon and Theseum the screens were fitted between the columns of the pronaos and opisthodomos, and reached from the floor to the soffit of the architrave. The horizontal bars were let into grooves cut at regular intervals in the columns and antæ, slightly behind their centre line; these grooves can be plainly seen in the two examples mentioned. Owing to these screens the temple doors could be opened to allow the interior to be visible to the people outside, and they also protected the treasure which on days of festival was displayed behind them. Between the central columns they were hinged for access. The doors of the temples were also of bronze, and over each was an open bronze grille, similar in design, probably, to that which still exists over the door of the Pantheon in Rome. The grooves made by opening the doors can easily be traced in the marble floors of the Parthenon and other temples.

Secular Work.

The remains of secular work are scanty. Besides the Propylæa, already mentioned, little calls for description. The private houses as a rule were small in size, and often of one storey

[1] To what extent bronze was employed for decorative purposes cannot be definitely stated, as the metal has found its way into the melting-pot long ago, but existing holes prove that lettering and shields of this material were fixed to the architrave of the Parthenon.

only. Most of the rooms faced courtyards, which were sometimes adorned by peristyles. The walls were in most cases of sun-dried bricks, sometimes merely of wood, although in certain towns stone was employed. The roofs were tiled, and many of the terra-cotta ornaments that decorated the eaves are preserved in museums, and show that the patterns on them were sometimes modelled and coloured, and sometimes only painted. The most extensive remains of domestic work are on the island of Delos, and at Priene, in Asia Minor, and these tend to show that as a rule each house had only one courtyard, round which the rooms were grouped, a narrow passage giving access to the street.

Tombs.

The tombs are very different in all respects from those of the earlier race described in a previous chapter. With the exception of the famous tomb erected at Halicarnassus, in Asia Minor, by Artemesia, in memory of her husband Mausolus, who died B.C. 353, they are mostly small. In many instances merely an upright monumental slab marks the resting-place of the dead. These slabs sometimes take the form of panels containing figures in high relief, many of which are beautiful examples of the sculptor's art; whilst others consist of only a narrow lofty slab, or stelé, the top of which is generally carved with the anthemion design. What the Halicarnassus mausoleum was like is not definitely known. Many attempts at restoration (on paper) have been made by Wren, Cockerell, Pullan, Fergusson, and others, but these differ widely from one another. Two facts alone are certain: one, that there was a peristyle of Ionic columns—one of the columns and a portion of the entablature and coffered ceiling are now in the British Museum; and the other, that a fine chariot group in marble—remains of which are also in the museum[1]—occupied a prominent position on the building.

Fig. 63.

Theatres.

Greek theatres are hardly buildings in the true sense of the

[1] In the British Museum catalogue it is stated that "the mausoleum consisted of a lofty basement, on which stood an oblong edifice, surrounded by thirty-six Ionic columns, and surmounted by a pyramid of twenty-four steps. This was crowned by a chariot group (*quadriga*) in white marble." Professor Cockerell's restoration, shown by a very beautiful drawing by his son, F. Pepys Cockerell, hangs on the wall of the museum.

word, as, except round the stage, no portions are raised above the ground. The Greeks always chose as sites natural amphitheatres, which allowed them to place the seats direct on the sloping ground, the required elevation for the back rows being thus obtained

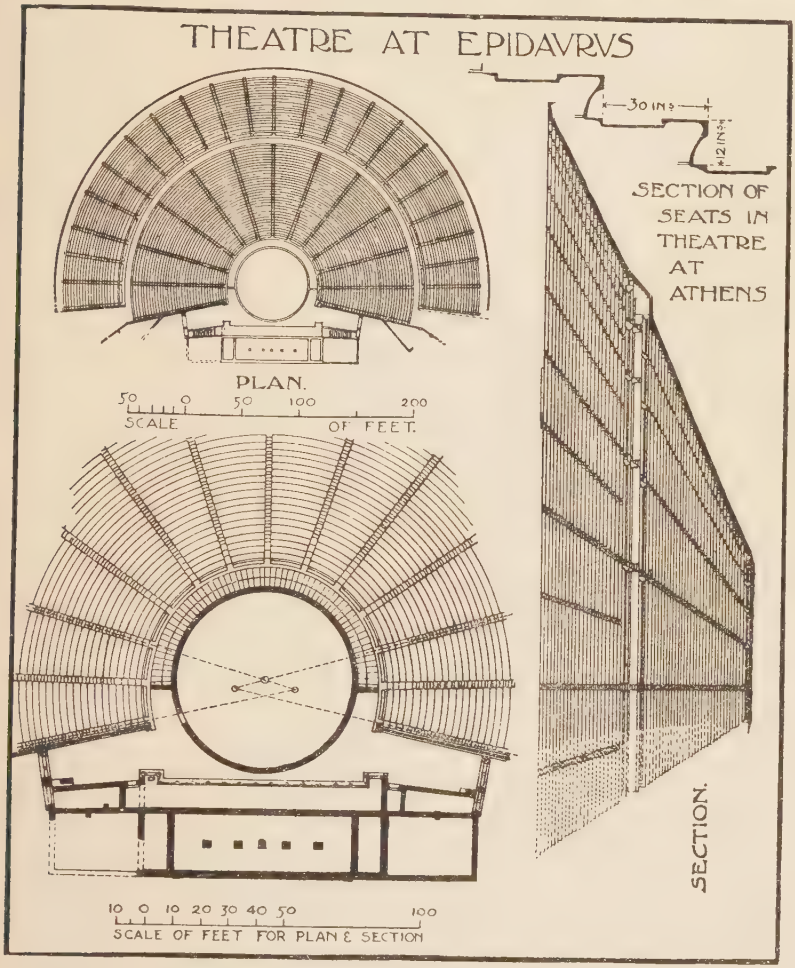


FIG. 61.

Dörpfeld.

without any walls below. The cavea, or auditorium, is generally horseshoe in plan, the depth from the stage to the back being greater than the width. In front of the stage is a circular space for the chorus, but only one example, that at Epidaurus, exists, in

which this portion was not altered and considerably curtailed in Roman times. In the centre of the circle stood an altar. It is a disputed point whether or not the stage itself was raised, but it seems probable that it was, otherwise the chorus would have obstructed the view of the spectators in the bottom row of seats, which was generally the principal one.[1] The theatre of Dionysus, below the Acropolis at Athens, built originally about B.C. 330, but considerably altered by Hadrian, is small, being only about 165 feet across at the top, but then the cavea is carried back very far, the seats being hewn out of the solid rock. The theatres at Dramyssus and Syracuse are much larger, and the stage alone of the former is as wide as the total width of the Athenian example. The most striking feature of the theatre of Dionysus is the semicircular row of Pentelic marble thrones at the bottom, sixty-seven in number. These all have backs, and are shaped with special view to the comfort of the occupants. The central throne, a charming design and richly carved, was reserved for the high priest. The theatre at Epidaurus is the best preserved of any in Greece, and is also one of the largest, being 360 feet across at the top. The cavea is divided into an upper and a lower division by a diazoma, or passage, which runs all round. The first and last rows of the lower half and the bottom row of the upper have backs. In the case of seats which have no backs, in this theatre as in other examples, the steps form the seats, a rebate being worked at the back to allow space for the feet of the people behind. At Taormina, in Sicily, is a large theatre magnificently placed in a somewhat unusual position on the top of a hill. It was built originally by the Greek settlers, but its present plan is very misleading, owing partly to alterations by the Romans, and partly to the attempts at restoration to which it has been subjected.

[1] Dr. Dörpfeld's view is that the stage was practically flush with the level of the orchestra; on the other hand, Professor Puchstein considers that it was raised some 10 or 12 feet.

CHAPTER VI.

ROMAN ARCHITECTURE.

From Greece to Rome is historically a natural step; architecturally it marks a great revolution. At no period in the history of architecture has so enormous a change resulted as was effected by the substitution of the Etruscan arch for the Greek lintel. There are only these two methods of spanning an opening, and the results of the change from one system of construction to the other were naturally far-reaching. The Greek was the last and finest of the trabeated styles of the world; the Roman, the first of a long sequence of great arched styles.

Importance of Roman work.

The importance of Roman work has been overlooked by some who judge of a style principally by its detail, and, taking that as a standard, pronounce the art of the Romans unsatisfactory. But that is not the way to judge architecture. It is not detail that makes a style, but the methods of construction which are employed, and the different ways in which those methods are applied. In construction the Romans excelled. If they had only possessed, in addition to their skill in this respect, the artistic sense of the Greeks, their architecture would have been the grandest the world has ever seen. But they relied too much on others. Although lovers and patrons of art, their main energies were not devoted to producing it. They were content in most cases to import artificers from other countries, chiefly from Greece, to carry out their ideas. These men they forced to work under conditions somewhat foreign to their ideals, and owing to this Roman buildings often lack that artistic completeness and sense of absolute fitness in all their parts which distinguish the masterpieces of other schools. Nevertheless, they possess important attributes of immense value. The planning is generally superb, the scale magnificent. These qualities are shown, not only in the buildings themselves, but also in their approaches and surroundings, which are mapped out with a supreme disregard for economic considerations, and with a truly

grand feeling for architectural effect. The scale on which the Romans built forms their most valuable legacy. It bore fruit in other countries besides Italy for many centuries after their empire had ceased to exist. In such towns, amongst others, as Albi, Orange, and Avignon in the South of France, at Autun in Burgundy, Trier in Germany, and in many an Eastern city, the love for size inherited by the people from their former masters is strongly perceptible. In Roman architecture you find the keynote to Roman character. In it the virtues and vices and cosmopolitan character of the race are clearly written. The Romans were luxurious and ostentatious, impatient of restraint, fond of outward pomp and show, and vain, with a vanity which urged them at all costs to surpass the work of their neighbours and predecessors, and to leave monuments which they fondly hoped would serve to remind posterity of their greatness and importance. And their work is vast and strong, lavishly decorated, but is lacking in refinement, and was often left incomplete, or else finished with a carelessness which shows their want of interest in detail. The emperors, when they were not employed in pulling down the buildings of their predecessors, built, partly to gratify their vanity, partly to propitiate the people; not so much from a love for architecture, as for the same reason that they organized games and entertainments in the amphitheatres and circuses; and the nobles and people followed suit, each one eager for display, and not over-critical so long as the building was sufficiently large and imposing.

Etruscan influence.

The principal influences which shaped Roman architecture in the beginning were, firstly, the work of the Etruscans; secondly, that of the Greeks in Southern Italy and Sicily; and later that of Greece itself. Little is known regarding the origin of the Etruscans, but it is certain that in pre-Roman days they spread over the whole of Italy, and that afterwards, when Rome was beginning to become a power, they occupied the central and southern parts. They were a building race with a strong feeling for grand proportions, and in that respect were akin to the Egyptians. They understood thoroughly the art of building in stone, and delighted in the use of huge blocks, generally uncemented, for their walls. For bridging openings they used the arch; either semicircular, with radiating voussoirs, or else pointed, with horizontal beds. The Cloaca Maxima in Rome, an old sewer, 11 feet wide, and over 12 feet high, which dates from

the time of the early Etruscan kings (about the sixth century B.C.), is covered by a stone vault with radiating voussoirs, and is probably the oldest arch of true construction in Europe. From this ancient race, therefore, the Romans learned the advantages of the arch over the lintel, a knowledge which they turned to excellent account. None of the Etruscan buildings remain intact, but ruins of them in different parts of Italy show clearly their character. The old Etruscan city of Fiesole, on the hills above Florence, contains interesting portions of city walls, baths, temples, aqueducts, etc. Other and important remains exist at Voltera, in Northern Etruria, at Perugia, Cortona, and in some of the old Etruscan cities in the Roman Campagna. Near one of these, Cerveteri, are interesting rock-cut tombs and tumuli, the latter showing that it was the custom of the Etruscans to raise pyramids of earth on solidly constructed vertical drums of stone. These are chiefly worthy of mention because they undoubtedly exercised considerable influence on later Roman tombs.

Etruscan temples.

From Vitruvius one learns that Etruscan temples often had three cells side by side, dedicated to different deities. This arrangement, which is different from any known Greek plan, was afterwards copied by the Romans in many of their temples. The porticoes of Etruscan temples consisted of wooden posts, which were widely spaced because the beams which they supported were also of wood. From the latter were suspended terra-cotta slabs, moulded on both sides, which hung down so as to form a kind of valance. These slabs were continued along the sides of temples under the eaves.

Greek influence.

The temples in Southern Italy and Sicily must from quite an early period have familiarized the Romans with Greek work. It was not, however, until the conquest of Greece, B.C. 146, that the full strength of her influence was felt. After the sacking of Corinth, the extent to which the treasures of Greek art were brought to Rome is hardly credible. The finest Greek statues decorated the interiors and exteriors of buildings, and the fora and streets of the capital. Moreover, Greek artists and artificers were compelled, or persuaded to come to Rome in great numbers, and Roman architects, it is well known, studied in Athens, which, although conquered, still maintained its supremacy as an artistic centre. Apollodorus of Damascus, the architect of Trajan's Forum in Rome, is one of the best known of the former; and Cossutius, the Roman architect who designed the Temple of

Jupiter at Athens, of the latter. Up to the time of Augustus, it is probable that Rome had few pretensions to be regarded as a fine city; even after that date marble palaces and hovels of wood or crude brick stood side by side. During the reigns of Augustus and his immediate successors, however, great improvements were effected in the laying out of the city, and in the architecture of its buildings. Large tracts within the walls were cleared to make way for the magnificent fora which formed so dignified and striking a feature of the town, and palaces, temples, baths, and other important public and private buildings sprang up on all sides.

Date of work.

Roman architecture may be said to start with the conquest of Greece, B.C. 146, and to extend to the transfer of the capital to Constantinople and the foundation of the Eastern empire in A.D. 330. After the latter date, all work may be regarded as coming under the head of early Christian, as the famous Edict of Constantine, legalizing Christianity, was published only a few years before, in A.D. 313. Before Constantinople became the capital the Roman Empire had been practically divided into four different parts, each under a separate ruler; so that its final partition into two, the Eastern and Western, was easy. The Eastern empire survived, notwithstanding sundry vicissitudes, until 1453; the Western came to an end in 476 A.D.

During the five centuries from B.C. 146 to A.D. 330, certain changes took place in architectural style, but not to the extent that might have been expected. At some periods the art flourished; at others it declined. Under Augustus, B.C. 27–14, it was refined, but hardly distinctively Roman. Under Nero, A.D. 54–68, an enormous amount of building took place in Rome itself, owing chiefly to the famous fire which destroyed so much of the most thickly populated and worst-built part of the city, and under Vespasian, Titus, and Domitian, A.D. 70–96, known as the Flavian emperors, numerous works were carried out, mostly gigantic in scale, and, as a rule, somewhat coarse in detail, like the Colosseum, but occasionally possessing greater refinement, like the Arch of Titus. The next period, which includes the reigns of Trajan, 98–117, and Hadrian, his successor, was likewise a time of great building activity, distinguished also by considerable excellence in design. Hadrian lived in Greece for some years, knew its architecture well, and caught some of its spirit. But the inspiration which animated him is not visible in later work.

After Septimius Severus and Caracalla, 193–217, art rapidly declined. Buildings grand in scale continued to be built, like the Basilica of Maxentius and Constantine, but their detail shows great deterioration, and the arch of Constantine in Rome, that *réchauffé* of earlier work, is a standing proof of the low ebb to which art in general, and sculpture in particular, had then fallen.

Where work exists.

The examples of Roman work during the different periods are by no means to be found now only in Rome itself. As the empire spread, wherever the Romans went they erected buildings similar to those of the Capital. In every town arose temples, basilicas, baths, palaces, and villas; and from the north of England to the south of France and Spain, and along both shores of the Mediterranean, the remains of these exist as testimonies of the mighty civilization which for nearly five centuries controlled the world. In France, the best examples are—at Nîmes, the famous temple known as the "Maison Carrée," the Amphitheatre, and the aqueduct just outside the town called the "Pont du Gard;" at Orange, the Theatre; at Reims, the Triumphal Arch; and at Autun, two gateways and some other buildings. In England the remains are scanty; a few mosaic floors of villas, and some fragments of walls and sites of camps and towns in different parts, notably in Northumberland, are all we have. In Germany the entrance gateway, or "Porta Nigra," the basilica, baths, and emperor's palace at Trier proclaim the former importance of that city, which was the northern capital when the empire was divided under four rulers. In Italy nearly every town, from Brindisi, with its broken column, to Brescia, with its ruined three-celled temple, or Milan, with its peristyle of ancient columns, has something which reveals the greatness of the ancient empire. The temples of Baalbec and Palmyra, the remains at Jerusalem and the rock-cut tombs at Petra, show how far the Romans penetrated in the East, and how remarkable were the buildings they erected there.

Divisions.

Roman architecture can be grouped under two main heads, according as to whether the lintel or the arch is employed. These methods of construction, however, overlapped one another to such an extent that it is impossible to say definitely when one began and the other ended. A dividing line might be drawn after the reign of Augustus, or, in other words, at the commencement of the Christian era, but this cannot be regarded as absolute. The

earlier work, the ruins of which still stand in the old excavated Roman forum, is of lintel construction, whilst most of the later examples are arched; but this division does not always hold good. On the one hand, the theatre of Marcellus, B.C. 13, is arched throughout in exactly the same way as the Colosseum, built nearly a hundred years later, and is designed on similar lines; and on the other, some of the temples of much later date, such as that of Faustina in Rome, A.D. 140, are entirely trabeated. The fact is that the Romans followed fairly closely Greek traditions when dealing with buildings connected with their religion, for which precedent existed in Greece; but in others of a secular character, such as their theatres, amphitheatres, and baths, for which Greek planning and construction were unsuited, they discarded precedent, and devised their own methods.

Roman "orders."

The Romans used the three Greek orders, the Doric, Ionic, and Corinthian, but subjected them to various alterations and modifications, which in the case of the first at least entirely changed its appearance and proportions. In addition, they are said to have added two more, the Tuscan and the Composite, making the number five (Figs. 66, 67). The term "the five orders" has been in general use for so long that it is probably little good now protesting against it; but a consideration of Roman work shows that the differences between some of these so-called "orders" are of little importance. The mischief was done at the time of the Renaissance, when men not only insisted on these divisions, but also framed arbitrary proportions for all the parts, however small, of each order. In Roman work these hard-and-fast rules did not exist, or, at all events, were not strictly followed, although certain main proportions were observed.[1]

Tuscan and Doric orders.

The so-called Tuscan order may be regarded either as a simplification of the Roman Doric, or as a translation into stone of an Etruscan wooden post. It has no very marked characteristics, but from its very simplicity and freedom from fussiness it possesses considerable dignity.[2]

[1] Vitruvius, whose book on architecture was discovered and republished about A.D. 1486, in dealing with temples, speaks of "three sorts of columns" . . . which, "different in form, have received the appellations of Doric, Ionic, and Corinthian." In another chapter, headed "Of the Tuscan proportions," he discusses these, but of the Composite order he says not a word. This omission may be owing to the fact that this was a subsequent modification, if the generally accepted date when he lived (*c.* Augustus, B.C. 27) be the correct one.

[2] Bernini's colonnade leading up to S. Peter's, Rome, shows how dignified the Tuscan order can be when used on a large scale.

The Roman Doric, as a rule, differs essentially from the Greek order from which it takes its name. It has neither the massiveness nor the extreme delicacy which constitute the great charm of the other. The proportions are more slender, the mouldings less refined, and the figure sculpture which added so greatly to the beauty of the Greek frieze is wanting; the bulls' skulls and garlands, the pateræ and accoutrements, and the other devices which fill the metopes in Roman work are but poor substitutes for figures full of grace and energy. The capital is considerably altered, and for the worse; a base is sometimes added; and the shaft is often unfluted. All Roman Doric columns, however, are not alike. The columns of the Colosseum, theatre of Marcellus, and other buildings of similar type, certainly bear a strong resemblance to one another, but the differences between them and Tuscan ones are undoubtedly less than the difference between them and the columns of the temple at Cori, in southern Italy, and many at Pompeii, which are also termed Doric. It is difficult to see how, if a distinction be drawn between so-called Tuscan and Doric columns, another should not be made between the columns at Cori and those on the Colosseum. It would be far better to drop the word Tuscan altogether, or, better still, drop the word Doric for Roman work, for which it is meaningless, and call all columns now classed under both heads Tuscan.

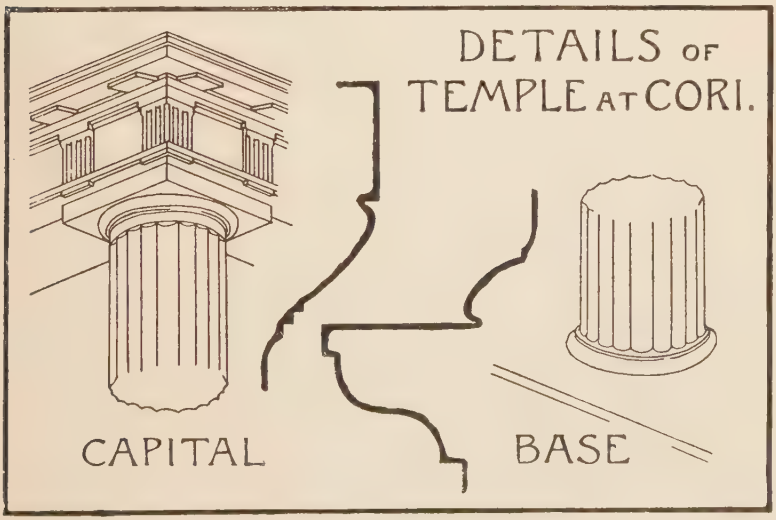


FIG. 65.

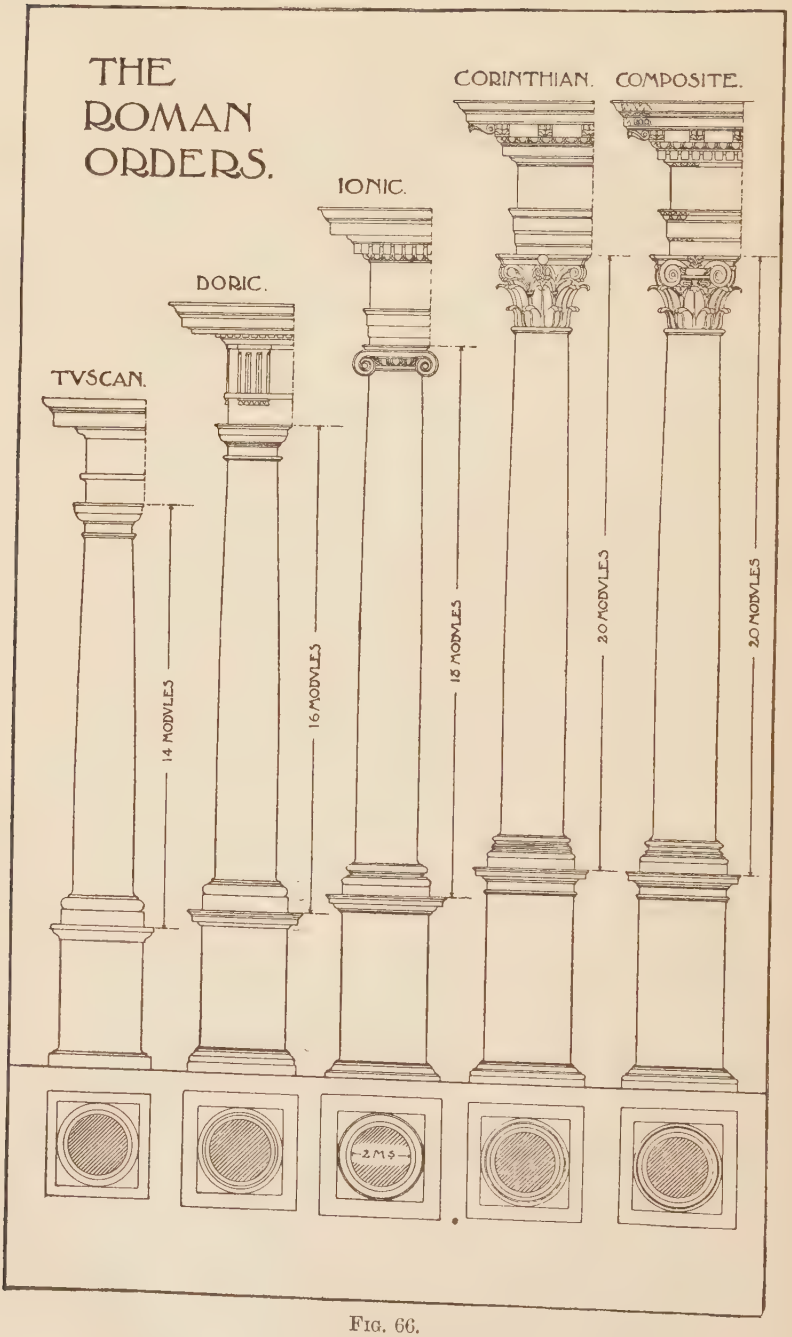

THE
ROMAN
ORDERS.
TVSCAN.
DORIC.
IONIC.
CORINTHIAN.
COMPOSITE.
14 MODVLES
16 MODVLES
18 MODVLES
20 MODVLES
20 MODVLES

FIG. 66.

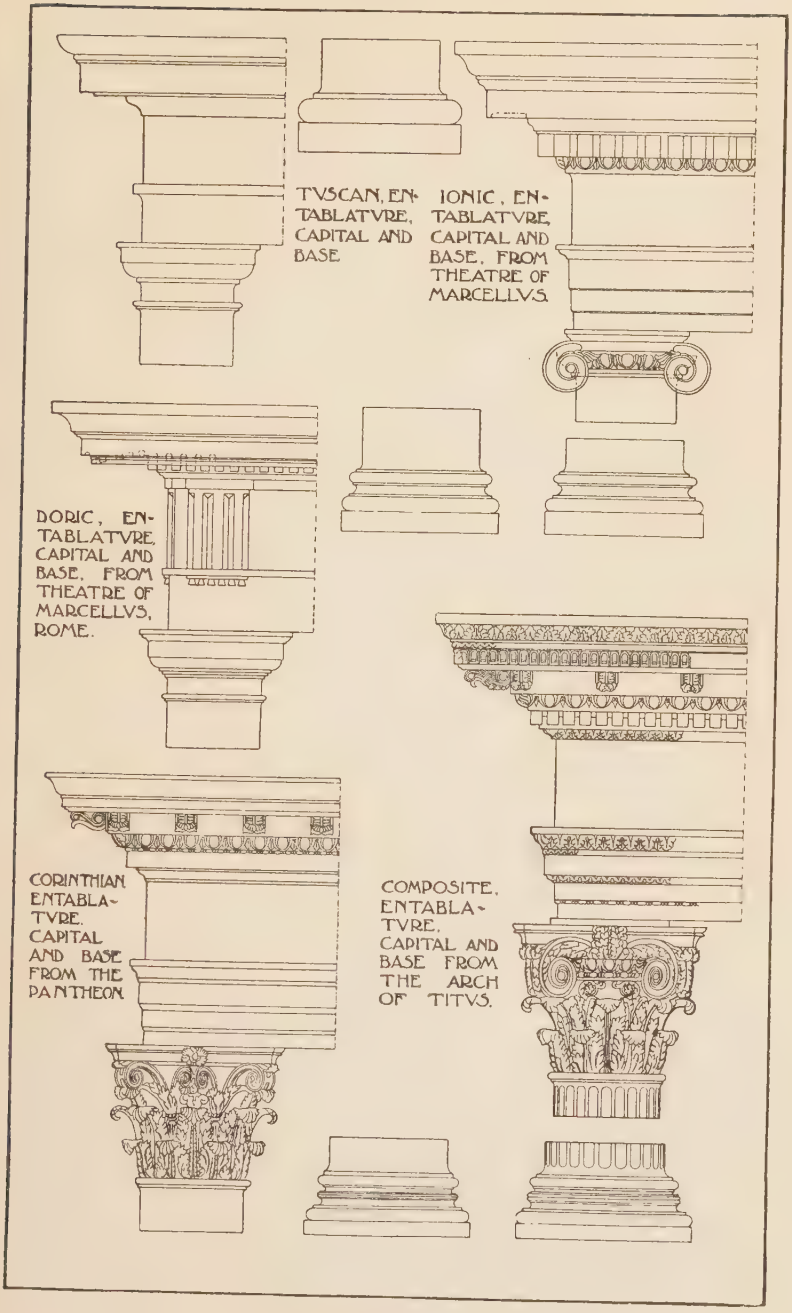

TVSCAN, ENTABLATVRE, CAPITAL AND BASE
IONIC, ENTABLATVRE, CAPITAL AND BASE, FROM THEATRE OF MARCELLVS.
DORIC, ENTABLATVRE, CAPITAL AND BASE, FROM THEATRE OF MARCELLVS, ROME.
CORINTHIAN ENTABLATVRE, CAPITAL AND BASE FROM THE PANTHEON
COMPOSITE, ENTABLATVRE, CAPITAL AND BASE FROM THE ARCH OF TITVS.

FIG. 67.

Ionic.

Less change took place in the Ionic order than in any other. The only difference, generally, between Greek and Roman Ionic capitals is a certain lack of refinement in the latter. In a few late examples, such as the temple of Saturn in Rome, of the third century A.D., volutes occur on all four sides of a capital, instead of only on two, and together with the abacus are curved in plan, as on angle columns in Greek work. Such a treatment, however, is exceptional, and in most cases both abacus and volutes are straight.

Corinthian and Composite.

The Corinthian was emphatically the favourite order of the Romans, and the one that they used, together with its sister the Composite, for most of their temples, triumphal arches, and public buildings. That they improved on the order of the Greeks is doubtful. They certainly elaborated it, but elaboration does not necessarily mean improvement, and not one of their capitals can compare in grace and refinement with the Greek example from Epidaurus. By the use of this order they were able to obtain a richness of effect not possible with the Doric or Ionic. In the first and second centuries A.D., the entablature of the order was often simple and yet very effective, as in the case of the Pantheon; but in later work it became much richer, and every single member was carved. This over-elaboration of detail destroyed the very effect it was intended to produce, as when there are no plain surfaces to emphasize the richness of others, carving and ornamentation become lost and valueless. In the cornice delightful effects of light and shade are produced by projecting brackets, or modillions, under the soffit below the upper members. These correspond somewhat to the mutules of the Greek Doric, but are differently shaped. The capitals generally quoted as most typical of the order are those of the Pantheon and the temple of Mars Ultor, but there was more variety than books on the "orders" lead one to suppose. The capitals of the circular temple at Tivoli are unlike in many respects those just mentioned, and so are many simpler capitals of pilasters and columns, which were so frequently copied by the architects of the Renaissance that they are sometimes regarded as creations of the fifteenth century.

No reason exists, except custom, for treating the Corinthian and Composite orders separately. In buildings which are regarded as of the latter order there is often a still greater elaboration of detail, slightly more slender proportions, the omission of the modillions, and an alteration in the capital. The last is really

the only difference of any importance at all, and even that cannot be regarded as of much moment. It consists in the use of larger volutes than are customary in the Corinthian order, and the result is much the same as would be produced if an Ionic capital, with all its volutes curving outwards, was placed above the bell of an ordinary Corinthian one. The arch of Titus, at Rome (*c.* A.D. 81), is said to be the earliest building in which the modification was attempted.

Column and arch.

In all the most characteristic buildings of the Romans the arch rules the design, and not the lintel. It was not, however, the substitution of one method of construction for another, great though the changes were that resulted from it, which give many of the buildings their distinctive character, nor was it the less important alterations in detail just mentioned. The character of work is mainly given by the manner in which arch construction is combined with a scheme of column and lintel decoration. In Greek work columns are supports; they stand free, and carry the entablature and whatever may be above it. In Roman work they are attached to the face of piers, projecting only a half or three-quarters of their diameter, and although they appear to support the entablature over them they really do nothing of the sort. The entablature is tailed into the wall in separate pieces of stone, and is supported, together with the wall, by arches thrown across from pier to pier. Columns in buildings of this type are merely applied accessories, which could be removed without damaging to any

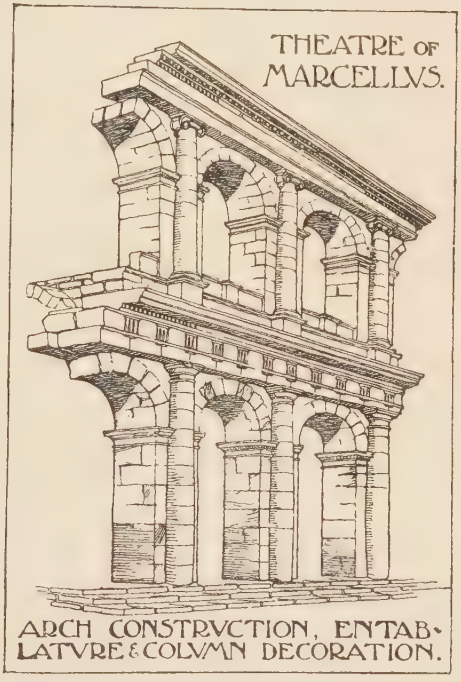


FIG. 68.

Viollet-le-duc (Librairies Imprimeries Reunies).

appreciable extent the strength of the building, and the entablatures are but string-courses which divide one storey from another. Hard names have been given to this arrangement. Fergusson calls it "a useless network;" but although it is responsible for much that is bad in the work of the last four centuries,—chiefly because it destroys the plain wall surface which is so valuable in a design,—when it is carried out on a sufficiently large scale and with much repetition of parts, as in the Colosseum, it produces remarkably grand effects. It is doubtful if any scheme of decoration could have been devised for this and other similar large buildings which would have been more telling. Much of the dislike which it has engendered is due to the fact that it is often applied to small buildings. But there the scale is at fault, not the design; the spire of Salisbury, or the towers of Canterbury half their present size would be equally unsatisfactory. Sometimes, however, the Romans carried the principle of applied decoration too far; as, for instance, when they used a pediment as a purely ornamental feature and plastered it on to a wall. This abuse occurs most frequently in late work, such as the Porta de' Borsari at Verona, but the arch of Augustus at Rimini shows that the practice was not unknown at the best period of Roman art.

In Greek work, columns had to be close together because the length of the lintel dictated the maximum distance they could be apart; but no such restriction hampered the Romans. The attached columns are consequently widely spaced, the distance from centre to centre being about equal to their height; or, in other words, they are from six to eight diameters apart.

Column above column.

The fact that their buildings were mostly many storeys in height led the Romans to place one column above another, and to give to each storey its own especial order. A regular sequence is invariably preserved; the strongest order comes at the bottom, the most slender at the top. Thus, in the Colosseum, the ground floor is Doric, the first floor Ionic, the second Corinthian, and the added top floor Composite (see Fig. 98). To obtain the necessary gradations in the width of columns, the diameter of an upper column at its base is generally the same as the diameter of the top of the one immediately below it. This is the case in the Theatre of Marcellus at Rome, but in the Colosseum the columns are the same width on all the storeys. As a help to good proportion, columns are frequently placed on pedestals, especially those on upper storeys, an expedient rarely practised by the Greeks.

All Roman buildings, however, are not designed on the same lines. Some of the most effective are also the plainest. The vast aqueducts and bridges consist merely of piers and arches, without columns of any kind, and yet they possess a dignity and sense of fine proportion which ornate buildings often lack.

Towards the latter days of the Western Empire, Roman architects introduced many modifications, and, dispensing altogether with piers and attached columns, placed the arches direct on the top of ordinary columns. This was a distinct step in advance, and one that was followed by the Byzantine and later builders. The entablature was still retained, but it became merely a decorative string course above the top of the arches. Sometimes also they bent an entire entablature over an arched head, as in Diocletian's Palace at Spalato, on the eastern side of the Adriatic, and also at Damascus and Baalbec in the East (Fig. 70).

Planning.

The Greeks used many and small points of support, the Romans, as a rule, few and large, because they required big open unencumbered floor spaces in their public buildings. These

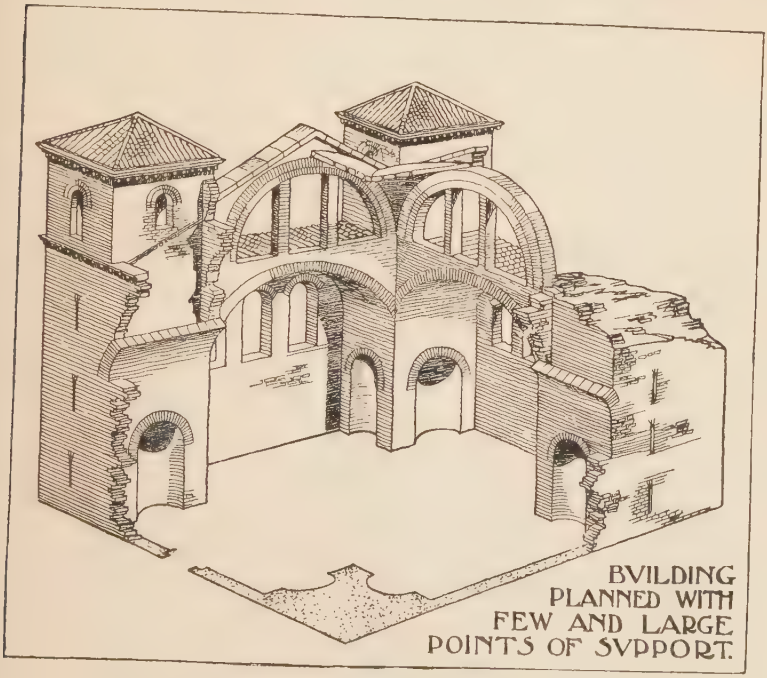


Fig. 69.

Viollet-le-duc (Librairies Imprimeries Reunies).

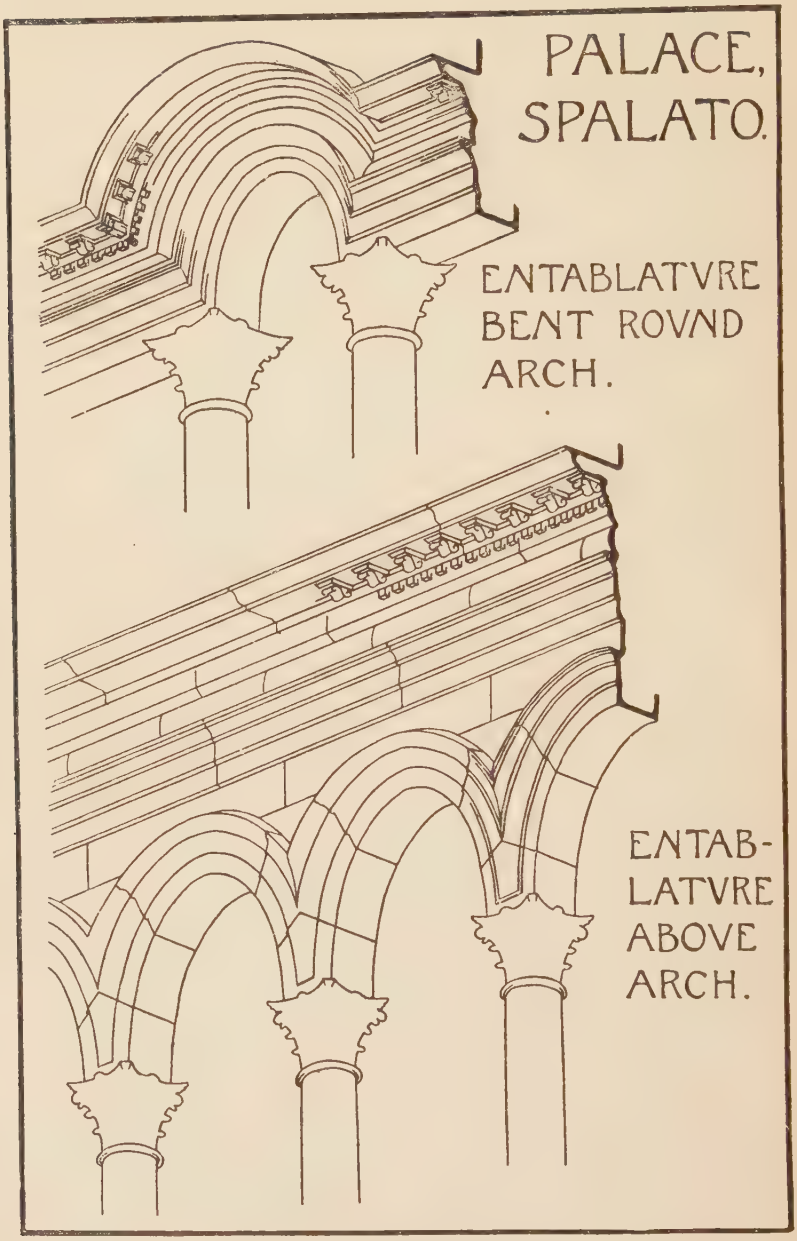

PALACE,
SPALATO.
ENTABLATVRE
BENT ROVND
ARCH.
ENTAB-
LATVRE
ABOVE
ARCH.

FIG. 70.

spaces they covered by vaults or by domes, to carry the weight of which massive piers were necessary. The Romans might, it is true, have roofed their large halls with timber roofs—most of their basilicas were so treated—but to their credit, be it said, they generally preferred the more architectural, and at the same time the more durable coverings for most of their large buildings. They did not dispense altogether with columns in interiors, on the contrary they used them freely, but always kept them in subordination to the piers, and placed them at the sides where they were out of the way. The columns became decorative features more than structural necessities. In addition, they gave scale. Now that most of the large halls in Rome are robbed of their columns, it is difficult to realize their size, but where columns still do remain, as in front of the niches in the Pantheon, their valuable scale-giving properties are at once apparent (see Figs. 81 and 91). From the Romans the Byzantines learnt the secret, and turned it to excellent account in S. Sophia, Constantinople, and in other large churches (see Chapter XI.).

Materials, Construction, and Decoration.

Concrete was the principal building material of the Romans; and without its aid their most characteristic and interesting work could not have been carried out. It would have been sheer waste of valuable material to have built their great piers and thick walls solid in marble or stone, and neither of these materials could have been used for their vaults. Concrete formed an excellent and inexpensive substitute for them. Its ingredients were easily obtainable; no skilled labour was required to lay it; a few overseers to direct operations were all that was necessary, and the work could be satisfactorily and expeditiously carried out by bands of slaves or pressed workmen, of whom the Romans always had thousands at their command. Besides concrete, the Romans used stone and brick, and, for decorative purposes chiefly, granite, marble, prophyry, alabaster, and bronze. Stucco, of great strength and thickness, was applied by them to all walls, external as well as internal, except those which were faced with marble or ashlar. Materials.

The chief building-stones in Rome were travertine, a hard lime-stone, tufa, and peperino, the two last being of volcanic origin. Tufa was employed in the earliest buildings to a considerable Stones.

extent, but it is a bad weathering stone and always had to be protected by stucco. Travertine and peperino were used for facing external walls, and in positions where considerable strength was required. The Romans, when they used stone, liked it big—some of the travertine blocks in the Colosseum are as much as 15 feet long—and many an arched opening, which otherwise would have no merit, owes its dignified appearance to the size of its voussoirs. They realized to the full that scale is nearly always more effective than ornament. In ashlar-faced walls the stones are sometimes bedded in mortar, sometimes laid without; in the latter case they are generally held together by metal cramps. The face is generally worked smooth, but in some instances the margins only of each stone are draughted, the centre being left as a raised panel.[1]

Bricks.

In Rome itself no walls were ever built of brick throughout; even in thin partitions, not more than 7 inches thick, the facings alone are brick, the core being of concrete.[2] In the provinces many walls are entirely of brick, or else of brick and stone in courses, three or four courses of brick generally alternating with the same number of courses of stone. Roman bricks are of two kinds, sun-dried and kiln-burnt. All bricks were stamped with the emperor's or the maker's name, or with some distinguishing mark, and, owing to this, many a dispute as to the date of a building has been settled beyond a doubt. All the sun-dried bricks have long since disappeared. According to Middleton,[3] they had to be kept five years, and then approved by a magistrate before they were used.

Concrete.

Concrete was not in general use for walls before the first century B.C., although floors had been made of it from quite an early period. Roman concrete owes its great strength chiefly to a volcanic deposit called pozzuolana, found largely round Rome, which, mixed with lime, sets extremely hard.[4] It is of two kinds, faced and unfaced. The latter was made in much the same way as concrete is now. Square posts boarded on the outside with planks formed two rows, distant from one another the required thickness of the wall, and into the space so formed

[1] This was not, as in Greek work, intended to be chiselled off afterwards.

[2] Existing brick-faced walls in Rome are very deceptive, as, unless in ruins, their construction cannot be seen, and they appear to be of brick throughout.

[3] "The Remains of Ancient Rome," by J. H. Middleton.

[4] The name is derived from Pozzuoli, near Naples, where large deposits also exist.

concrete was thrown and spread in layers. The vertical chases where the posts came and the marks left by the boards can still be seen in the cellar walls under the imperial palaces of Rome.

The other kind of concrete was faced with either stone or brick. In stone-faced concrete the facing generally consists of spikes of stone, about 3 inches square on the outside, and tapering to a point, which are bedded in the mass behind. On the face of the wall the squares are placed lozenge-wise, and form a pattern. The arches and quoins are sometimes of stone

Faced concrete.

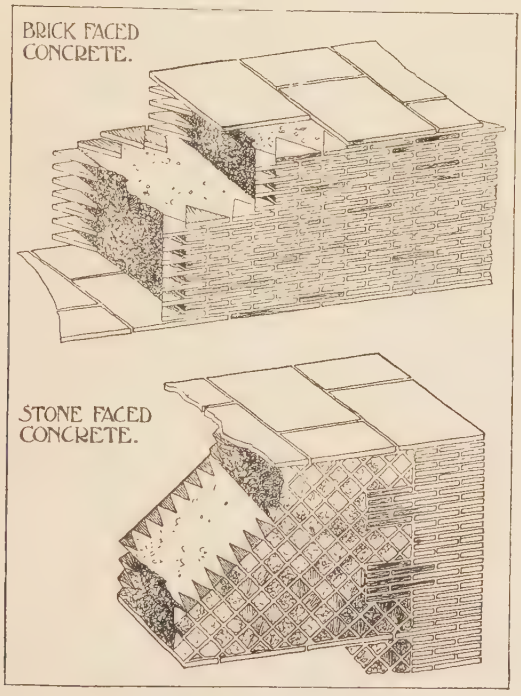


FIG. 71.

Middleton (A. & C. Black).

but they are more usually built in brick. In brick-faced concrete the bricks are equilateral triangles, and they are laid in courses, breaking joint with one another. The bricks are an inch to an inch and three-quarters thick, and the mortar joints are about the same thickness. At regular intervals, which vary from 3 to 5 feet in height, bond courses are introduced of large rectangular bricks, about 1 foot 11 inches (2 Roman feet)

square. In consequence of this, walls are generally 1 foot 11 inches thick, or a multiple of that dimension. The reason for the brick and stone facings is difficult to understand. They had little practical value, as they were not of sufficient strength to keep the concrete behind in position when it was setting—boards or some other lateral supports must have been required for this[1]—and they were not used for appearance sake, as they were always covered and hidden from view by either marble or stucco.

Arches.

Brick arches over openings are constructed in a similar

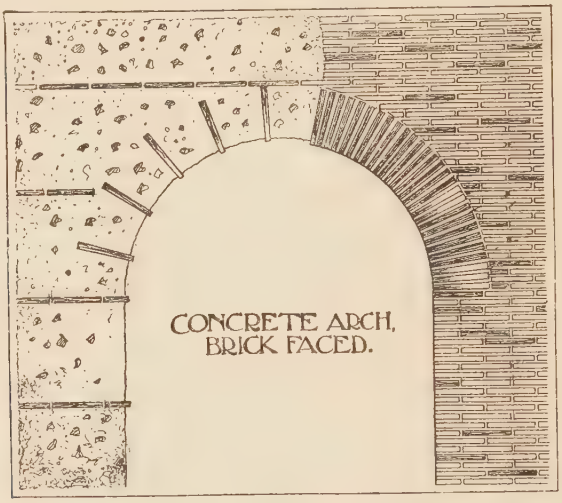


Fig. 72.
Middleton (A. & C. Black).

manner to the walling. Most of the bricks tail only a few inches, 5 or 6, into the concrete behind, but it is a mistake to say that the arches are merely skin deep, as every sixth or seventh brick is a bonding brick which extends through the thickness of the wall. The arch behind the facing is thus divided into a series of divisions, or boxes, which are filled with concrete. This doubtless was done in order

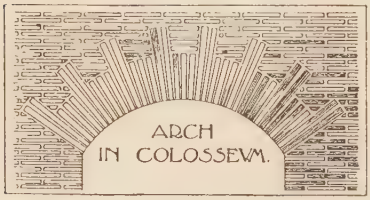


Fig. 73.

[1] Middleton says that the marks left by the boards can be seen on brick-faced concrete that has been covered up, but that the marks soon fade.

to keep the concrete in position, and to prevent it from slipping on to the haunches. For the same reason, in many of the arches of the Colosseum some of the bricks forming the voussoirs are taller than others, as shown in the accompanying sketch.

Roman vaults are nearly always of concrete, and are constructed so as to form a solid homogeneous mass, which, after it has once set, exercises no lateral thrust. This is the secret of their success. If their construction had been different, if they had been built of brick or stone, in the manner adopted by the later mediæval architects, their thrusts would have been so great that the difficulties of erection would have been increased tenfold. It must not be forgotten that the spans of these vaults are far greater than the spans of Gothic vaults. A method of construction suitable for a span of 40 feet may be quite unsuitable for one double that width, and many Roman vaults are more than that. Two kinds of vaults were popular with the Romans; the barrel, and the intersecting or groined vault. The latter was generally employed in the baths and other big buildings. It is formed by the intersection of two barrel vaults, cutting one another at right angles, and the lines of intersection are termed groins. It has two great advantages over the barrel vault; its weight is concentrated at certain points, and it facilitates the lighting of interiors, as windows can be placed high up immediately under the crown of the vault, whilst in barrel vaults they must be below the springing line. Vaults and domes.

Barrel vaults were built as follows: brick rings were generally placed about 2 feet apart, and were joined together at regular intervals by brick bonding courses. These divided the vault into a series of rectangular compartments, which were filled with concrete of no great thickness. The brickwork was supported on wooden planks and light wooden centering, and was allowed to set before the concrete was added. Sometimes the rings were much farther apart, in which case planks were laid between them to support the first layer of concrete. When this layer had set, it was more than sufficiently strong to carry the second layer; and the more layers that were put on the stronger the vault became. A thorough wetting on the back of each layer before the next was applied ensured that the whole should set into one solid mass. Sometimes, according to M. Choisy, another plan was adopted. Above a light centering of wood, large square tiles were laid flat and bedded in cement; and after these had set,

a second layer of somewhat smaller tiles was laid on top. Some of the latter were bedded vertically, so as to give a better hold to the concrete. These two thicknesses of tiles, assisted as they

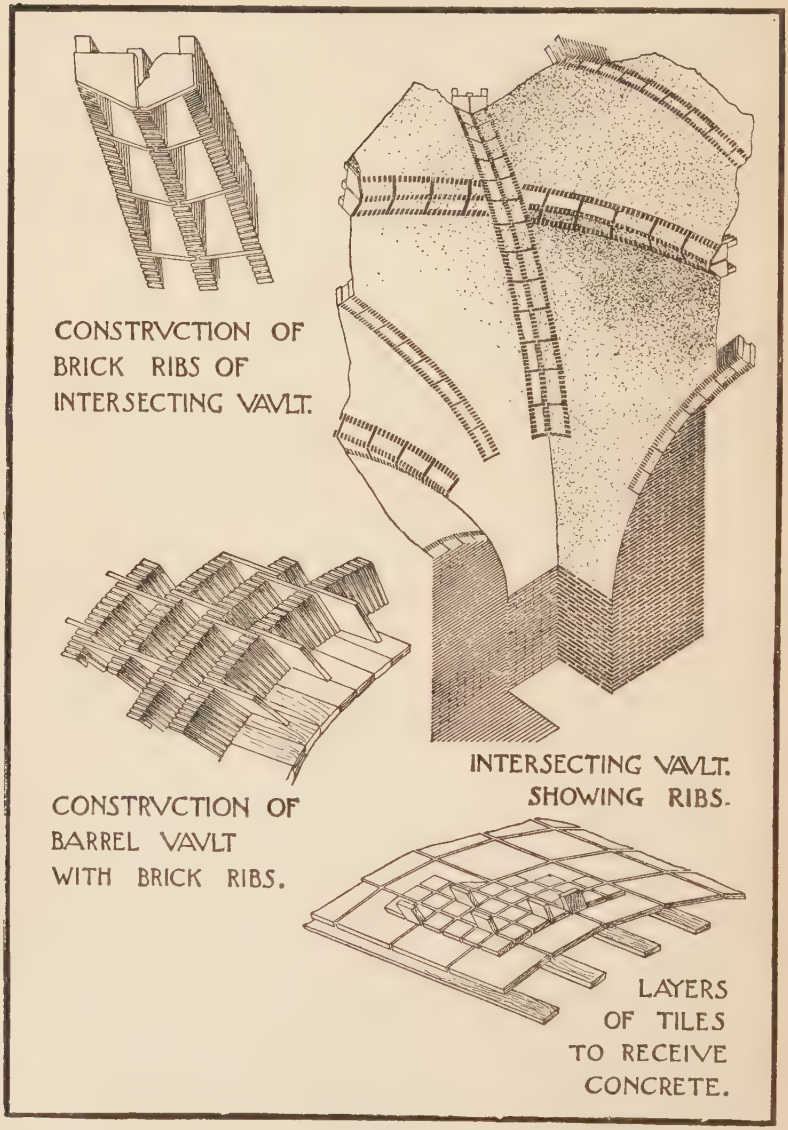


Fig. 74.
Choisy.

were by the centering below, formed a bed sufficiently strong to carry the weight of the first layer of concrete; afterwards the different layers were applied as mentioned above. By this arrangement the wood centering carried the first course of tiles; that carried the second; the two together supported the first layer of concrete, and that in its turn was strong enough to receive more concrete. In intersecting vaults much the same method was adopted as in barrel vaults. At the lines of intersection ribs were built first, consisting of tiles specially made to the required shape, with a course of tiles, a little distance apart, on each side. The three courses were joined together by bonding courses, and formed permanent diagonal ribs, which, after they had set, were sufficiently strong to carry the concrete in-filling without the aid of further centering.

In domes the construction was much the same. Tile ribs started at the springing, and met at a circle round the apex. The ribs were connected by bonding courses, which were often horizontal. The lower part of the dome of the Pantheon, however, according to M. Chedanne, who has made a special study of that building, is built entirely of bricks laid horizontally. It therefore exercises no more thrust than if it had been of concrete. The deep coffered panels which decorate so many of the vaults and domes in Rome were either formed between the ribs, or else were hewn out of the solid concrete. In these huge vaults and domes the expense of wooden centering was a serious item, and this to a great extent accounts for the methods of construction adopted.[1]

Stone vaults.

In the latter days of the empire the Romans built vaults of stone, of which many still remain in Syria, and one is at Nîmes, in a building known as the temple or baths of Diana. All these are designed so as to reduce to a minimum the necessary centering. At Nîmes, the vault over the principal hall consists of transverse ribs of stone placed some feet apart, and on these are laid other stones to complete the vault. The

[1] Middleton says, in his "Ancient Rome," that in M. Choisy's book, "L'Art de Bâtir chez les Romains," "more importance is given to the constructional use of brick than it really possesses in Rome itself." Middleton's knowledge of Rome was so great that his opinion carries considerable weight, but the existing vaults, especially those in the baths of Diocletian and Caracalla, tend to show that M. Choisy is not far wrong, and that some such schemes as those described above must have been adopted.

ribs were built first, and allowed to set before the others were added. Another expedient for diminishing centering for stone vaults and arches was adopted in the Pont du Gard, also at Nîmes. In that bridge, at a point about one-third the height of the arch, the voussoirs project below the soffit and form ledges, on which the centering for the upper part rested. These ledges still remain, as well as other ledges on the face, on which the scaffolding was placed. (See Fig. 102.)

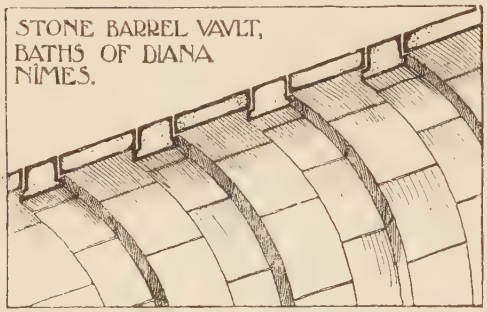


Fig. 75.

Marble, etc.

As regards the other building materials, marble was little used in Rome until the early days of the empire, but after that it was largely employed for columns and for facings to concrete walls. At first only Greek marbles, such as Pentelic and Hymettian, were available, but about the time of Augustus the Italian quarries began to be worked, and Carrara, Cipollino, Pavonazzo, and other varieties came into the market. The Romans also imported alabaster from the East, red and grey granites from Egypt, and basalts, porphyries, and various precious materials to add to the splendour of their buildings. Most Roman columns are monolithic and unfluted, like the granite ones of the Pantheon portico and those of Cipollino marble in the portico of the Temple of Faustina. In not fluting these, the Romans combined good taste with economy, as to flute so hard a material as granite is a very costly operation, and a marble with strongly marked veins, like Cipollino, is better unfluted, as then the full beauty of the figure can show. Some early columns, however, are fluted, as in the Temple of Fortune, and are not monolithic, being built up in drums as in Greek work.

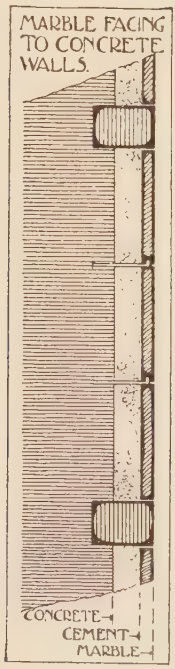


Fig. 76.

Facing slabs of marble for the outside of walls were, in the time of Augustus, of considerable thickness—5 to 8 inches—with bonding courses of greater depth at intervals; but in the second and third centuries A.D. they became often merely a veneer, and are less than an inch thick. The marble was fixed to concrete walls by long metal cramps, but there was generally a backing of cement in addition. The wealth of marble in Rome in the first and second centuries A.D. must have been immense. Very little now remains, as most of it was converted into lime for building purposes or else was cut up for pavements in the Middle Ages.

Stucco was largely used by Roman builders to cover those portions of their concrete walls which were not faced with marble. The true Roman stucco is very different from the modern makeshift. It was applied in from three to six different coats, and in external work is often as much as 3 inches thick. Its ingredients are sand, lime, and marble dust, and, owing to the presence of the last named, it is capable of receiving a very high polish, and provides an excellent surface for decoration. Its lasting properties are very great, and it formed a preservative to the walling behind. In the Colosseum and other buildings in Rome, fragments of stucco still remain almost as sound as ever, although they have been exposed to the weather for many centuries. The Romans also used a very thin stucco, composed of lime and powdered white marble with some glutinous substance added, of not more than one-sixteenth to one-eighth of an inch in thickness. This was applied to stone columns, capitals, and entablatures, as in Greek work, and many instances of it are still to be seen amongst the ruins of Pompeii. Stucco.

Bronze was sometimes used constructionally, but its chief value was for decorative purposes. There is some doubt regarding the nature of the girders which formerly carried the ceiling of the portico of the Pantheon. Some writers say they were of bronze, others, of wood cased with bronze. The panels of the ceiling itself were undoubtedly of bronze, and of considerable thickness too; as, when the ceiling was removed, by order of Pope Urban VIII. in 1626, enough was obtained to cast 110 cannons for the castle of S. Angelo, and to form the existing baldachino over the high altar in S. Peter's at Rome. Bronze tiles plated with gold covered the roofs of many of the temples in Rome, including the Pantheon. The entrance door and fanlight of that building, together with the moulding round the eye of the dome, Bronze.

which still exist, are of bronze. Bronze was also largely used for minor decorative purposes, such as wreaths, garlands, lettering, etc., which were fixed to walls.

Internal decorations.

If the internal decorations of Roman buildings were lacking in refinement, they certainly made up for it in splendour. Columns and pilasters of marble, porphyry, and granite lined the sides of halls or stood in front of niches; the floors were of marble flags, or of mosaic; and the walls were faced with slabs of the finest and most richly coloured marbles arranged in panels. These in some instances formed merely a high dado, in others they reached to the ceiling. In the former case, the wall above was generally covered with stucco in panels. Many of these panels were filled with modelled figures and conventional floral designs in fairly high relief, and were surrounded by mouldings which, although of slight projection—the right treatment for the material—were often much enriched. The vaults were also panelled in stucco, and both walls and vaults were painted and richly gilded. In the Colosseum plaster panelling, in some cases plain, in others enriched, remains on some of the walls; and on the vaults of the basilica of Constantine are still many of the original enrichments.

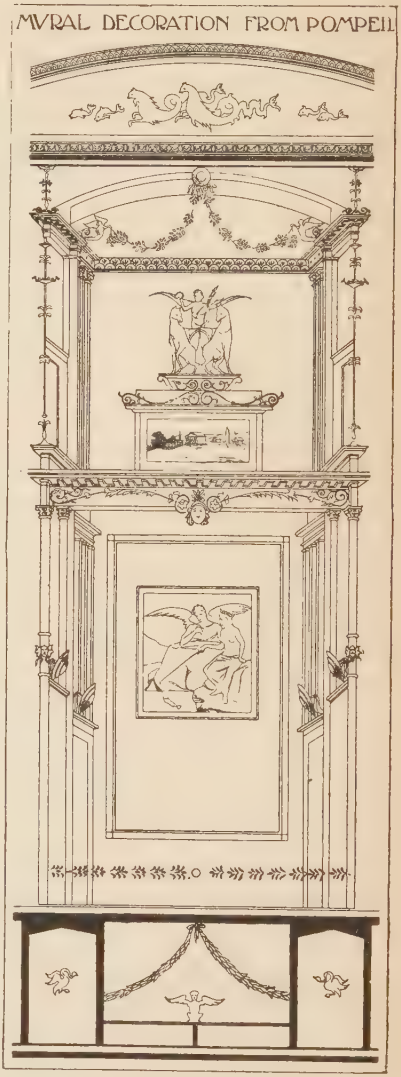


Fig. 77.
D'Amelio (Richter).

Paintings.

In many private houses the walls were covered entirely by paintings. These paintings were executed direct on the plaster in fresco, tempera, oil, or caustic, the last being the favourite and most durable method. In it the medium used was wax, which was heated to make it liquid, and then mixed with the pigments. Great brilliancy is obtainable by this process, as many extant examples prove. In decorations of a simple character, the walls are divided into large panels of plain colour with a pattern round; and sometimes a carefully painted little picture is introduced in the upper part of a panel. In more elaborate schemes the walls are covered with figure subjects, landscapes, or views of interiors. In nearly all these, architectural features are introduced, many of which have extremely attenuated proportions. This is sometimes regarded as a proof that iron and bronze were in common use for columns and other structural parts of buildings. But those who uphold that theory ignore the fact that similar proportions are frequently found in modern decorative designs, and yet no one imagines that the artists are trying to copy iron construction. Most of the existing examples in which these features occur are from Pompeii—some are still *in situ* there, although the best are in the museum at Naples—and the likelihood is that the workmen who executed them, being either Greeks or of Greek origin, took a decorative licence.

Great care was taken to protect mural paintings from injury by damp. Outside walls were often built hollow; and in the house of Livia, on the Palatine in Rome, the plaster is applied to a vertical layer of tiles, which is separated from the outer wall by a cavity.

CHAPTER VII.

THE BUILDINGS OF THE ROMANS.

Planning of Cities.

The Romans, whenever possible, strove to obtain a symmetrical plan for their towns and buildings. In some cities this was extremely difficult, especially in Rome, where the hilly character of the site was coupled with the fact that the city had been allowed to grow up within the walls as it listed in the early days when little heed was paid to architectural effect. The great efforts which they made there to surmount the natural difficulties of the site emphasize strongly their undoubted love for symmetry. When new cities were founded, the Romans followed the plan adopted in their camps of a straight central thoroughfare, crossed at right angles in the middle by another main street. At the crossing was generally placed the forum, and round it were grouped the principal buildings of the city. The city of Pompeii affords a good instance of a central grouping. At one end of the long narrow forum is the Temple of Jupiter, behind which are the baths; at the other end are the basilica and court houses; and surrounding the two sides are more temples and other important public buildings.

Colonnaded streets.

In many Eastern cities the principal streets were lined by covered colonnades, which allowed the inhabitants to pass from one part of the town to another sheltered from the fierce rays of the sun. Remains of these exist at Palmyra, Damascus, and Gerasa. In Rome covered footpaths were not so essential, as the porticoes which entirely surrounded the many fora answered the same purpose, and provided the necessary shelter.

The Fora.

The fora were in reality large market squares for the sale of provisions, merchandise, and all the commodities necessary

for the welfare of the inhabitants of a large city. Before the erection of the large amphitheatres and circuses, which were afterwards so numerous in Rome, they also served for gladiatorial fights and scenic displays. In Rome at one period there were seventeen fora, of which the largest, and architecturally the most magnificent, was the Forum of Trajan; and the oldest and most renowned historically, the Forum Magnum, or Romanum, now commonly known as *the* Forum. This, unlike the others —which were erected at one period, and in most cases by a single emperor,—was of gradual growth and of somewhat irregular form, as additions were made to it from time to time as the city

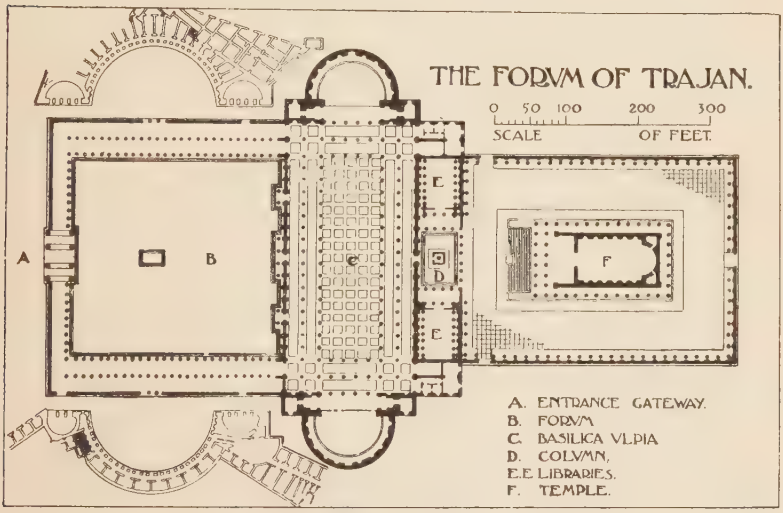


FIG. 78.
Lanciani.

increased and as its wants multiplied. It included within its precincts the temples of Concord, Vespasian, Saturn, and Castor; the Basilica Julia; the two meeting-places for the plebeians and the patricians; the Rostra, from which speeches and orations were delivered; the Arch of Severus, and other buildings; whilst surrounding these were numerous pedestals for statues of distinguished men. Through the Forum ran the Sacra Via, historically the most interesting of all the Roman streets, and beyond it lay the temple and house of the Vestal Virgins, with the Colosseum and temple of Venus and Rome in the distance.

Forum of Trajan.

All the fora erected by the emperors were planned symmetrically, and surrounded by lofty walls. No two were exactly alike in plan, but a description of the Forum of Trajan is sufficient to afford an idea of the general arrangements. The principal entrance to it was from the Forum of Augustus through a triumphal arch. This led into the forum proper, a vast open space about 280 feet wide, which was surrounded on two sides by covered porticoes with double rows of columns. Outside these on each side was a vast semicircle of shops and offices several storeys high. Facing the entrance gateway, at the far end, was the Basilica Ulpia, the largest of all the Roman basilicas, and beyond it was a small peristylar square, in the centre of which stood the Column of Trajan, flanked by small buildings used as libraries, one for Latin and the other for Greek books. The temple, which was central with the other buildings, completed this noble scheme. The architect was Apollodorus of Damascus, who designed many buildings for Trajan and Hadrian. Blocks of houses, more or less modern, now cover the greater portion of the site, but Trajan's Column still stands intact, and much of the pavement and the stumps and bases of many of the granite columns of the basilica are also visible, although Middleton says that none of the latter remain *in situ*.

Basilicas.

A basilica was, in the first place, a court of justice, the emperor's or magistrate's seat being placed in the apse at the end, which was divided off from the rest of the building by screens, or "cancelli." The larger basilicas were put to other uses. They were, in fact, vast covered halls, where client and attorney could discuss cases, and where merchants and others could meet to transact business. They were of two types: in one, numerous columns divided the interior into nave and aisles, and the roofs were of wood; in the other, vaults of concrete rested on a few piers of considerable size.

Wood-roofed basilicas.

The Basilica of Trajan is the best known of the wood-roofed type. It consisted of a central nave about 280 feet long and 80 feet wide, surrounded on all sides by double aisles, with an apse at each end. Monolithic granite columns divided the nave from the aisles and the aisles from each other, and over the aisles were galleries. Whether the central space was roofed

or not is a disputed point. Gilbert Scott holds, in his "Essay on the History of English Church Architecture," that it was not; but in this he is at variance with others who have attempted restorations. Canina, in his "L'Architettura Romana," shows low roofs over the side galleries, and a higher roof, with a flat ceiling under, over the centre. In his restoration clerestory windows, in the wall over the columns of the gallery on each side and at the ends, light the central portion, and the galleries and aisles are lighted from the side. The imperial Basilica of Domitian, on the Palatine Hill, was a similar but smaller building.

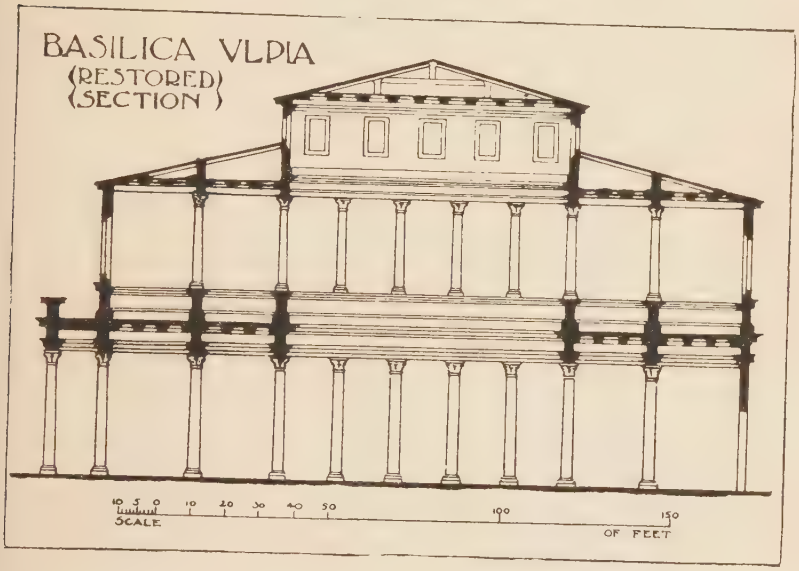


FIG. 79.

Provincial basilicas were also of this type, so far as can be judged from existing buildings. At Pompeii the walls of one are still standing, and at Trier, in Germany, is an excellent example, built of brick, which is in a very good state of preservation. The latter at present consists of an aisleless hall about 80 feet wide, with a semicircular apse of less width at one end. No remains exist of galleries or of internal columns; but, considering the width of the building, the planning of other basilicas, and especially the double tier of windows on the outside, it is probable that the interior was originally divided into central and side

aisles like the other examples, and that the upper windows lighted the galleries.

Vaulted basilicas.

The basilica commenced by Maxentius and finished by Constantine is the great example of the other type. Inside, instead of ninety-six granite columns as in Trajan's basilica, there were only four great piers of concrete, each over 14 feet wide. The two buildings covered much the same amount of ground, and the width of the central area was about the same in both. But there the resemblance between the two ended. Constantine's basilica had no continuous aisles, but on each side of the nave were three recesses, each 74 feet wide and 56 feet deep —those on one side are still standing—which were divided from one another by walls pierced by single semicircular-headed openings. The central hall was covered by three intersecting vaults, and the recesses by barrel vaults, at right angles to the central axis of the building. The existing side vaults are deeply coffered with large octagons and small lozenges, in which are still many of the original stucco mouldings and enrichments. The weight of the central vaulting was concentrated over the massive piers, in front of which stood detached columns from which the vault sprang. These columns, however, were hardly structural necessities, and although they have long since disappeared, the only portions of the vault remaining are those which came immediately over them, and which now hang suspended without support underneath, a tribute to the homogeneity of Roman concrete. Over each column was placed an entablature, no portion of which was returned along the wall. This was a common and detestable Roman practice; and one of the most curious facts in the history of architecture is the way this objectionable feature was blindly

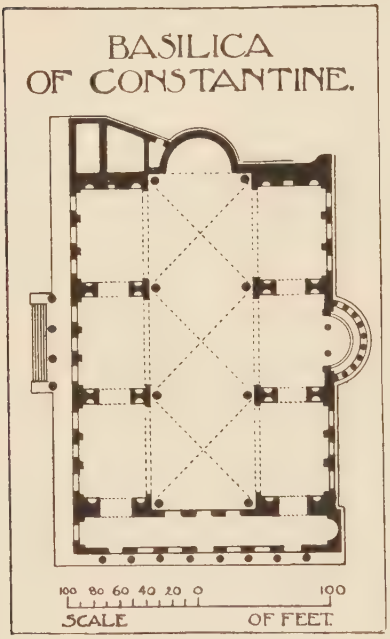


FIG. 80.
Lanciani.

FIG. 81.

Viollet-le-duc.

copied by the later architects of the Renaissance. The recesses are lighted by windows in the side walls, and the central hall by large lunettes immediately below the intersecting vaults and above the side barrel vaults.

The walls between the recesses were carried up above the barrel vaults to act as abutments to the central vault. They were, in fact, buttresses, and occupied the same position, and

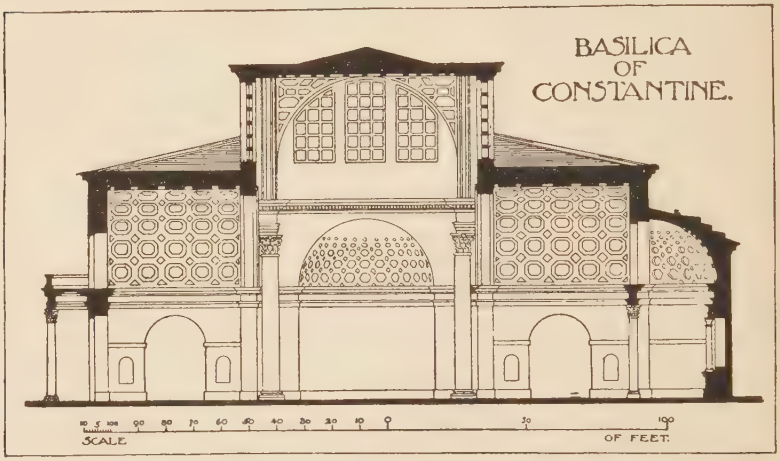


FIG. 82.

to a certain extent performed the same function, as the flying buttresses of mediæval churches.[1] One of the chief merits of Roman vaults is that, owing to their great thickness—they were often from 5 to 6 feet thick—the outside covering, whatever it was, cement or bronze tiles, could be laid direct on the concrete, thus dispensing with the protecting timber-framed roof, which was necessary above the far thinner vaults of the Middle Ages.

TEMPLES.

The temples are the most Greek of all Roman buildings. Most of them are rectangular in plan, but a few, and amongst them the largest of all, the Pantheon, are circular. Like those of Greece, they were more homes for deities and shrines than buildings in which to worship. They were also used for many purposes, some of which appear decidedly incongruous. Thus, the Temple

[1] They were of most use whilst the vaults were still "green;" as after a concrete vault has set it exercises no lateral thrust.

of Concord was frequently used for meetings of the Senate, and was especially noted for its collection of works of art brought from Greece, Egypt, and the old Etruscan cities. The Temple of Mars Ultor contained a number of statues of famous generals; and in it the Senate assembled when they wished to deliberate concerning a triumph to a victor. In the Temple of Saturn was housed the chief public treasure; and some part of the Temple of Castor was "used as an office for the verification of weights and measures." The altar, as in Greece, was placed outside, in the centre of a court surrounded by covered porticoes.

Rectangular temples.

The chief peculiarities of rectangular temples are: (1) They are not, as a rule, peripteral, but of the type known as pseudo-peripteral. (2) Their width is often greater than their length. (3) Each is raised on a high substructure, or podium, and is approached by a wide flight of steps at the entrance, on each side of which is a dwarf wall for marble and bronze figures and groups. (4) Most are of the Corinthian order; a few are of the Ionic, and only one or two of the Doric. (5) In some examples the end terminates with an apse. (6) Some are vaulted in concrete, the walls being of the same material. In the typical pseudo-peripteral plan, the cella is widened at the expense of the peristyle and ambulatory at the sides, which disappear entirely. Columns, however, are retained in front and form an entrance portico. In many of the examples, such as the Temple of Fortuna Virilis in Rome, and in the Maison Carrée, at Nîmes, half-columns are attached to the end and side walls of the cella, flush with the columns of the portico. Only a few temples were divided internally by columns into nave and aisles, but most had columns placed against the walls, as in the Temple of Venus and Rome, thus somewhat reducing the span without interfering with the floor space, and at the same time giving scale (see Fig. 85).

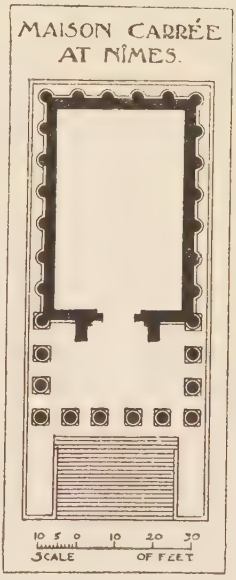


FIG. 83.

Early temples.

Very few remains exist of temples erected prior to the commencement of the Christian era. Three columns alone are standing of the Temple of Castor and Pollux (formerly known

as Jupiter Stator) in the Forum, which was commenced by Augustus, but was not finished until 6 A.D. The columns are of excellent proportion, and the capitals are amongst the best in Rome, although now much mutilated. The frieze over them

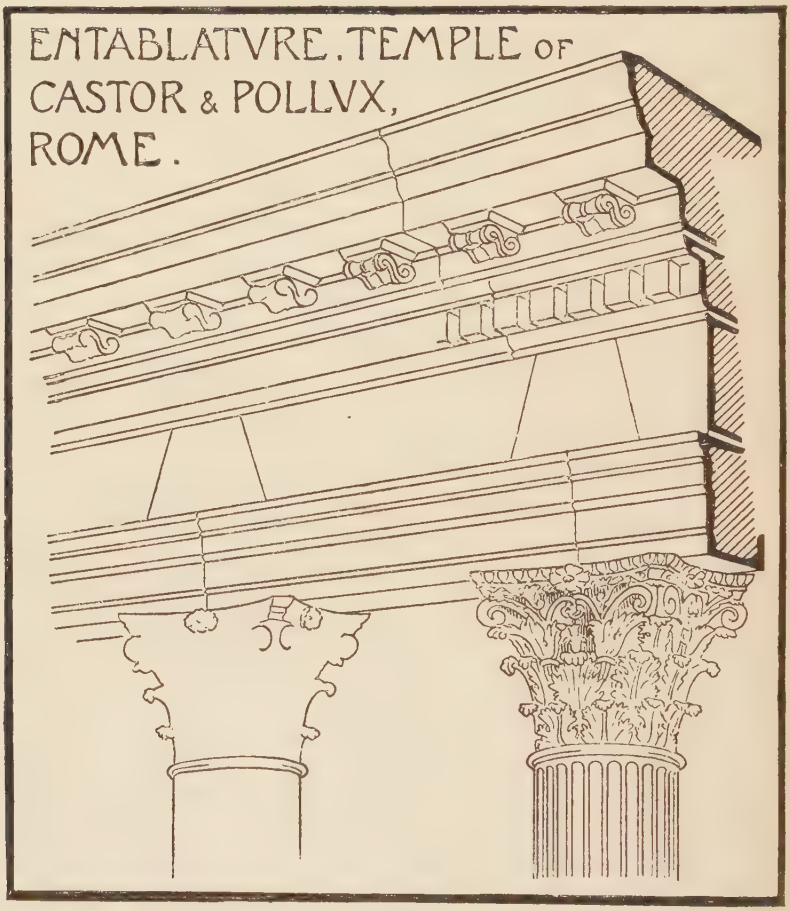


FIG. 84.

is jointed, so as to act as a discharging arch, and take the weight off the architrave, which is shallower than in Greek examples.[1] The temple of Mars Ultor was dedicated in the year 2 B.C. The ruins of it include portions of a fine coffered marble ceiling over

[1] The columns are 48 feet high, their diameter at the base is 4 feet 9 inches, and the entablature is 12 feet 6 inches high, or about one quarter of the height of the columns.

the ambulatory, and part of the cella wall. The latter is built of peperino stone, and was faced with thin slabs of marble, with thicker bands of marble at intervals which still exist. The most interesting feature, however, is the semicircular apse at the end of the cella. This is an early instance, in a temple, of the apsidal ending which afterwards formed the chancel in early Christian churches. These two temples were probably peripteral; or, at all events, had peristyles at the sides and in front.

Temple of Venus and Rome.

The finest temple in Rome, if the accounts given of it are correct, must have been that built by Hadrian, and dedicated to Venus and Rome. As the dedication shows, the temple was a double one, and consisted of two cellæ and two apses which were

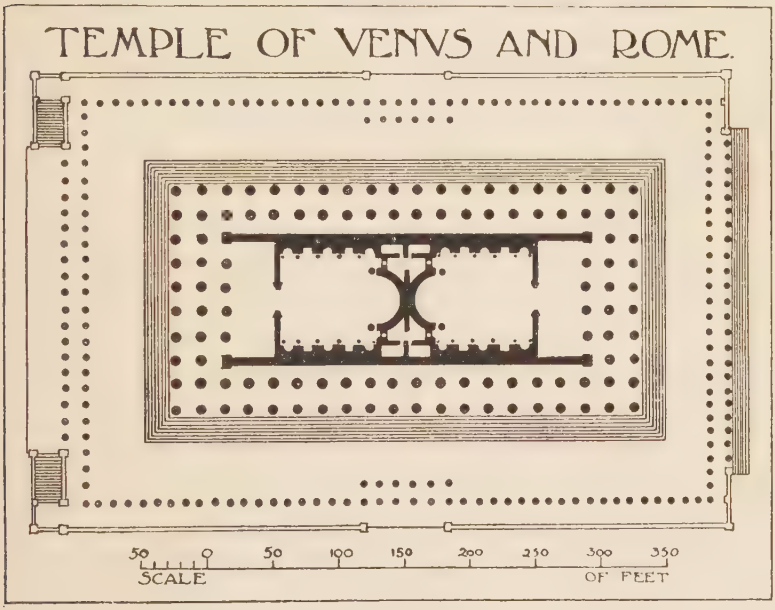


FIG. 85.
Lanciani.

placed back to back. The side walls were continued so as to conceal the apses, and surrounding the building was a peristyle. Each cella was about 70 feet square, exclusive of its apse, and was vaulted by a barrel vault in concrete. The bronze tiles, plated with gold, which formed the outer covering of the vaults, were stripped by Pope Honorius I., in the seventh century, for the Church of S. Peter, but were looted by the Saracens when they captured the city. The temple was placed on a vast level

platform, which is said to have been enclosed by lofty walls lined on the inside with gigantic columns of porphyry and granite. All that remains are the two apses with their semi-domes and some fragments of the walls of the cellæ.

Pseudo-peripteral temples.

Most of the other temples in Rome are pseudo-peripteral. Of this type are the Temple of Vespasian, in the Forum, of which only three columns remain; and the hexastyle Temple of Faustina, also in the Forum, built by her husband, Antoninus Pius, about 141 A.D. The cella has been converted into the Church of San Lorenzo in Miranda, and has, therefore, suffered considerably; but the portico is still standing. The shafts of the columns are unfluted monoliths of cippolino marble, whilst the capitals and bases are of white Athenian marble. All the above-mentioned temples are of the Corinthian order.

The pretty little tetrastyle Temple of Fortuna Virilis, so called, in the Forum Boarium, erected, according to Middleton, in the first century B.C., is Ionic. The walls and columns are of stone, and were originally covered with stucco.

Provincial temples.

The most famous and the best-preserved of the provincial temples is that at Nîmes, and is known as the Maison Carrée. It was built in the first few years of the Christian era, and to this early date, and to the fact that Greek colonies had been established in the neighbourhood centuries before, is due the excellence of its

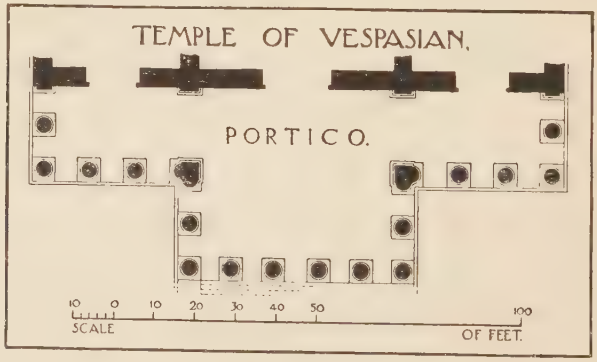


Fig. 86.

proportions and detail. Some of the refinements existing in the Parthenon and other Greek temples also occur here, showing that the old traditions of fine workmanship had not been lost (see Figs. 83 and 88). The triple-celled temple at Brescia, in North Italy, attributed to Vespasian, is an excellent example of

the type, not uncommon in Italy, in which three cells are placed side by side, an arrangement which may have been borrowed from the Etruscans. An entrance portico of sixteen columns and two piers extends across the whole of the front, the central columns projecting to form a hexastyle porch.

Eastern temples.

The surroundings of Eastern temples, such as those at Baalbec and Palmyra, both in Syria, are on a scale of magnificence greater even than Roman ones enjoyed. At Baalbec there are three temples, two of which are rectangular in plan, whilst the third is circular of unusual design. The approach to the great rectangular temple is by an entrance portico with a wide flight of steps in front, a hexagonal court with covered recesses all round it, and a large quadrangle which is also surrounded by recesses, alternately oblong and semicircular in plan, in front of which are monolithic granite columns. Large

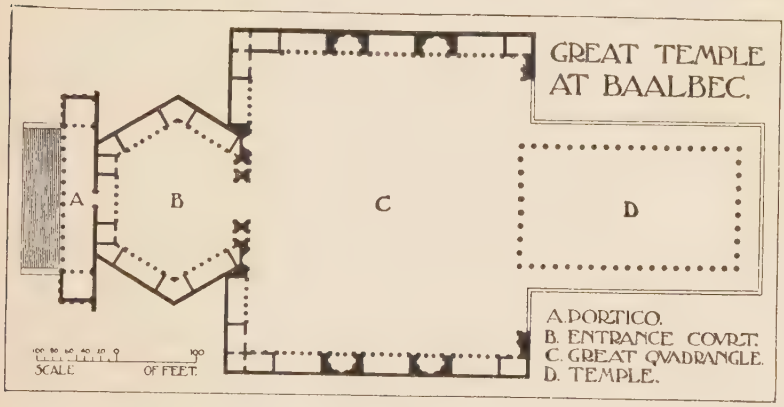


FIG. 87.

stones were common in the East, and in the lower part of this temple are three blocks which are probably the largest in any building. Each is 12 feet high, 11 feet thick, and over 60 feet long.[1] The smaller rectangular temple, which stands to one side of the great quadrangle, is an excellent example of Roman work of the third century A.D. Much of its beauty is doubtless due to Greek artificers, whose forefathers had settled in Syria some centuries before. On the columns round the courtyard of the

[1] In Anderson and Spiers' "Architecture of Greece and Rome," a photograph is shown of a block still remaining in the quarry at Baalbec, which actually measures 77 by 15 by 14 feet, and weighs 820 tons.

great temple at Palmyra are corbel brackets, about half-way up, on which figures of famous men were placed. This method of honouring benefactors and distinguished citizens was a favourite in the town, as the columns lining the great central street have similar brackets. In their orientation, Syrian temples, like Greek ones, face the east, and in this respect differ from the temples in Rome, where orientation was evidently regarded as of little account.

Dimensions.

The following table gives the approximate dimensions of a few Roman temples, and, when compared with that already given of Greek ones, illustrates the relative differences between the sizes of the respective cellæ and of the temples themselves :—

Name of temple.	External length, including portico or peristyle.	External width.	Internal length of cella.	Internal width of cella.
	feet.	feet.	feet.	feet.
Faustina, at Rome, Corinthian.	139	68	78	60
Venus and Rome, at Rome, Corinthian.	360	175	70 [1]	70
Maison Carrée, at Nîmes, Corinthian.	86	43	53	34
Smaller Temple, at Baalbec, Syria, Corinthian.	227	122	125	72

[1] This dimension is the length of each cella, exclusive of the apse.

Circular Temples.

The Pantheon.

The largest and most wonderful of all Roman temples is the Pantheon; that vast circular edifice due to the greatest of all the Roman builders, the Emperor Hadrian (*c.* 117 A.D.). It consists of two portions; the entrance portico in front, and the rotunda behind.

Portico.

The portico belonged originally to a temple built by Agrippa, and was taken down and rebuilt in its present position some time after the rotunda was built. The careless way in which it is joined on to the main building is in itself a proof, apart from other evidence, that the two were not erected simultaneously. Not even a Roman architect, however indifferent about detail, would have deliberately designed so unsatisfactory a juncture. In the rebuilding, the number of columns in front was changed from ten to eight, the present number, and others were added behind to divide the portico into three divisions,

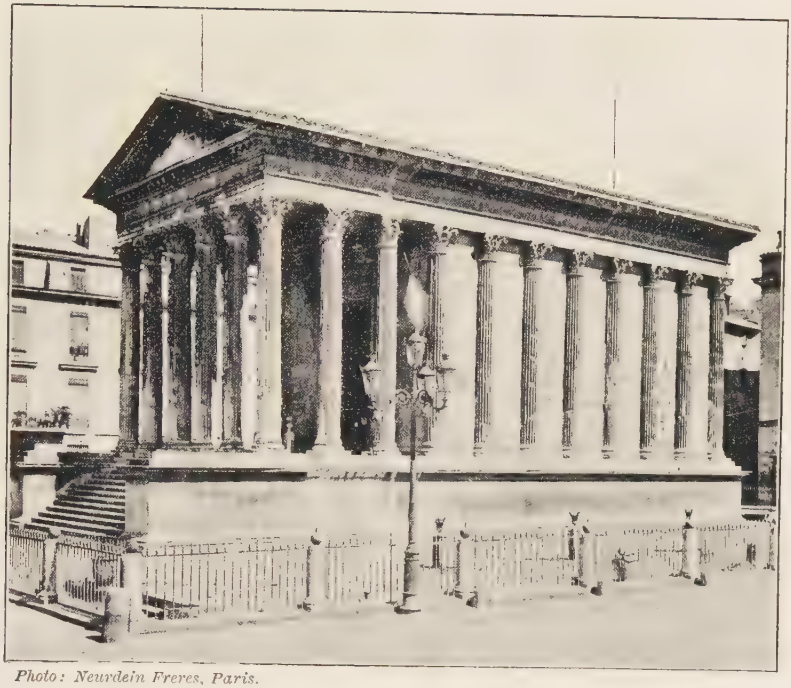


Photo: Neurdein Freres, Paris.

FIG. 88 — MAISON CARRÉE, NÎMES.

Photo: Alinari.

FIG. 89.—THE PANTHEON, ROME. [*To face p.* 138.

making the total number of columns sixteen. The pediment was altered to fit the narrower width, and to this is due the steepness of its pitch, which is much greater than in Greek pediments, or even in other Roman ones. The shafts of the columns are chiefly of red and of grey Egyptian granite, unfluted and monolithic, and the capitals and bases are of white Pentelic marble. The tympanum of the pediment was originally filled with bronze figures, but all have long since disappeared, and only the holes for the cramps by which they were fixed remain as evidence of the composition. On the frieze below, an inscription records the dedication of the first temple by Agrippa, in 27 B.C.; and other inscriptions in smaller letters refer to restorations by Septimius Severus and Caracalla, at the beginning of the third century A.D. Mention has already been made of the fate of the bronze work of the ceiling of the porch, the removal of which has laid bare the constructional barrel vaults above.

Rotunda.

The rotunda is said to occupy a portion of the site of a circular piazza, which preceded Agrippa's original temple. The interior is 142 feet 6 inches wide, exclusive of the recesses, and the height is the same. The surrounding wall is of concrete 20 feet thick, but this is not solid throughout, as there are eight recesses on the ground floor, five rectangular (of which one forms the entrance) and three semi-circular. Besides these, there are other vaulted niches at this level and also above, which are walled off from the interior. In front of each of the big recesses, except the one forming the entrance, and that opposite in which the high altar is placed, are two marble columns in antis, which carry the entablature. These otherwise have little structural value, as over each pair, but hidden from view, is a strong discharging arch, which carries the weight of the wall above. Their chief value is that they give scale. Without them the Pantheon would not look half its size. Mr. Chedanne has discovered that between the top of the columns and the under side of each discharging arch are brick piers, but the main structural work is done by the arches. The two central recesses, which have no columns in front of them or entablatures across them, are covered, one by a barrel vault, the other by a semi-dome, both of which spring from the top of the entablature. The columns in antis are not equally spaced, the central intercolumniation is 8 feet 4 inches wide, whereas the sides are only 7 feet. The greater width given to the central space produces a

good effect, especially as the difference is so slight as not to be strongly apparent.[1] Half the height of the Pantheon internally is vertical wall, the other half is dome. This suggests bad proportion; but such is not the case, as the division between the two is not strongly marked, and, by an optical illusion, the wall does not look vertical, but appears to curve slightly inwards, as though the dome started from the floor-level. In the upper half of the wall, above the principal entablature, is a series of empty niches, which have a very bare appearance; but these are not part of the original design. The dome is deeply coffered; and the square panels at one time were surrounded by enriched mouldings in stucco, painted and gilded, and a bronze flower came in the centre of each panel. All these enrichments have now disappeared, and only the plain fascias remain, but it is doubtful if the effect could ever have been finer than it is at present. The sharp shadows falling on these recessed fascias and panels, and the charming play of light and shade all over the dome, more than compensate for the loss of the mouldings and their enrichments and colour, which must have broken the shadows and weakened them. The fine appearance of the interior is in a great measure due to the method of lighting adopted. Only one opening, and that a circular one at the crown of the dome, about 28 feet wide, lights this vast hall. The amount of light it gives is ample, and, what is of equal importance, this is evenly distributed over the whole of the building. No scheme of side lighting, however ingenious,

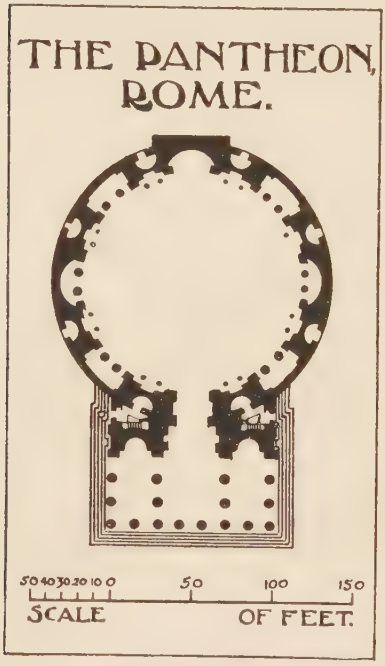


FIG. 90.
Lanciani.

[1] In the circular church at Naples, built at the beginning of the last century, which is a modified copy of the Pantheon, the columns round the interior are equally spaced, and produce a very monotonous effect.

could produce so fine an effect. The surface of the marble floor is slightly convex; which may have been done to counteract the curve of the dome over, which would have made it look concave if it had been quite flat; or merely so that the rain which enters through the eye could more easily run off.

The doorway opening to the rotunda is 40 feet high and 20 feet wide. At the sides are pilasters of cast bronze, which form the door frame. The doors themselves are 26 feet 6 inches high, and over them is a lattice fanlight which reaches to the underside of the frame. Both doors and fanlight are also of bronze, and, according to Middleton, were originally plated with

Doorway.

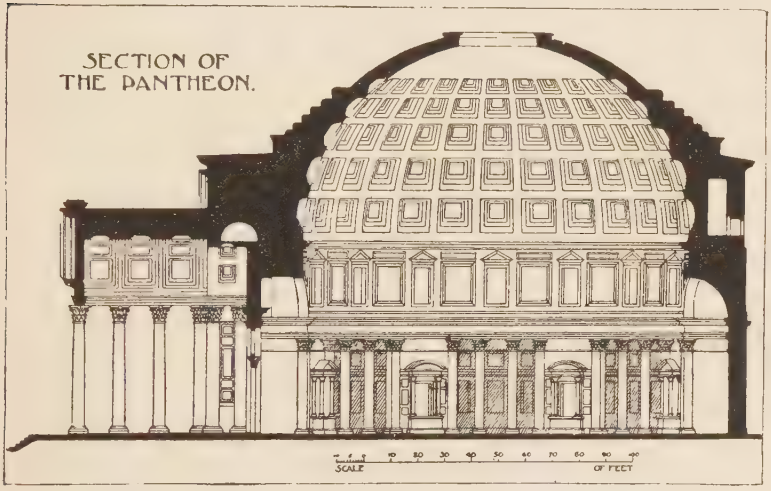


FIG. 91.

gold. These are the oldest and at the same time the finest ancient doors in Rome, and, together with the somewhat similar ones in the Temple of Romulus, *c.* 300, in the Forum (now the Church of Sti. Cosma and Damiano), show what Roman craftsmanship was capable of producing in metal.

The exterior of the rotunda is far inferior in appearance to the interior, although very impressive owing to its great bulk. The wall is carried up higher than on the inside, so as to weight the haunches of the dome, although this precaution was hardly necessary considering its homogeneous character. Above it the dome rises in steps at first, and only the upper part of it is curved.

The exterior of rotunda.

The whole was originally covered with tiles of bronze plated with gold, which remained until A.D. 663; when, notwithstanding that the building had been consecrated as a church only half a century before, they were stripped off by Constans II., who was conveying them to Constantinople when he was attacked by the Saracens at Syracuse, and this rich spoil fell into their hands.

The wall, which is about 100 feet high, is of brick-faced concrete, and is divided into three stages by brick cornices. The two upper stages were covered originally with stucco, and the lowest one was faced with white Pentelic marble about 5 inches thick, portions of which still remain on the projecting masses against which the portico abuts. In the upper stages are semi-circular brick arches at regular intervals all round the building. These are to some extent unconstructional, but bonding courses, as described in the last chapter, probably continue through the thickness of the wall to corresponding arches on the inside. The arches must have had some use, either as stiffeners to the concrete or to prevent it from slipping, otherwise they would not be there. The Romans were too practical a nation to build arches, which could not be seen, without some good reason.

Peripteral examples.

Other circular temples are much smaller, and are peripteral. The best known is the one at Tivoli, near Rome, called the temple of the Sybils, which owes its reputation as much to the magnificence of its position as to the beauty of its design. The circular cella, 24 feet in diameter, is built of stone-faced concrete, and is surrounded by a peristyle of eighteen columns, 24 feet high. The feeling throughout is very Greek, although the order is Corinthian; the bases have no square slabs underneath, the columns are fluted and are built up in drums with fine joints, and the general excellence of the proportions and detail supports the theory that this temple was erected about the beginning of the first century B.C., and is, therefore, one of the earliest Roman ones in existence. The interior is lighted by two large windows, over 9 feet high. A similar, but slightly larger, temple in the Forum Boarium in Rome, near the little Temple of Fortune, has a peristyle of twenty columns. The entablature has disappeared, and the modern flat-pitched roof makes an ugly finish to what is otherwise a refined and delicate piece of work. The circular temple at Baalbec, with its curved entablature and podium, is interesting as an original composition in a style which was then

Photo: Alinari.

FIG. 92.—TEMPLE AT TIVOLI.

[*To face p.* 142.

nearing its end, and also because its design has been copied more than once by later architects.[1]

Thermæ.

The Roman thermæ, or baths, were great institutions, far surpassing in size and magnificence all modern buildings to which the name might be applied. They were to the man of leisure what the basilicas were to the man of business, and formed the general meeting-place for those who had no work to do, or whose work for the day was finished. They combined the Eastern and the Western methods of bathing. Each contained a hot-air room, the calidarium; small compartments with hot-water baths; a large hall heated to a moderate temperature, called the tepidarium; the frigidarium, which contained the cold-water swimming-bath; and open courts surrounded by peristyles, which were fitted as lounges and filled with the sculptured treasures of ancient Greece. Round these were grouped other small rooms for dressing in, for anointing the body with oil, for shampooing, and for other rites connected with the bath. In addition, either in separate buildings or attached to the main block, were gymnasia, halls for discussion, rooms for athletes, and smaller rooms for other purposes which are now not definitely known. A stadium, or stand, from which racing, wrestling, and other sports could be viewed, formed an adjunct to many of the large baths. The hot rooms and the hot-water baths were heated by means of hypocausts. The hot air, from furnaces under the building, passed either in the thickness of the floors and walls, which were built hollow to allow of this, or else through hollow tiles fixed against the sides of walls, which formed in some cases a complete lining from floor to ceiling. These flue-tiles could be arranged so as to regulate to a nicety the temperature of the different rooms. Many of them are still *in situ* in the Baths of Caracalla and elsewhere.

Principal baths.

Until the time of Augustus the baths were generally small and unimportant, and very different from the vast buildings raised subsequently by successive emperors in order to curry favour with the people. The following built large thermæ in Rome: Agrippa, 21 B.C.; Nero, A.D. 60; Titus, 80; Trajan, 110; Caracalla, 206; Diocletian, 295; and Constantine, A.D. 320. Remains of all these exist, but the most important are those of

[1] See Wood's "The Ruins of Baalbec."

Caracalla, and Diocletian. These are splendid examples of the symmetrical planning and bigness of scale so conspicuous in all Roman work, and for this reason deserve description. Their construction is typically Roman; and in no other buildings can the Roman method of few and large points of support, combined with concrete vaults of wide span, be better studied.

The Baths of Caracalla stood on a vast artificial platform, which was raised 20 feet above the level of the street, and

Baths of Caracalla.

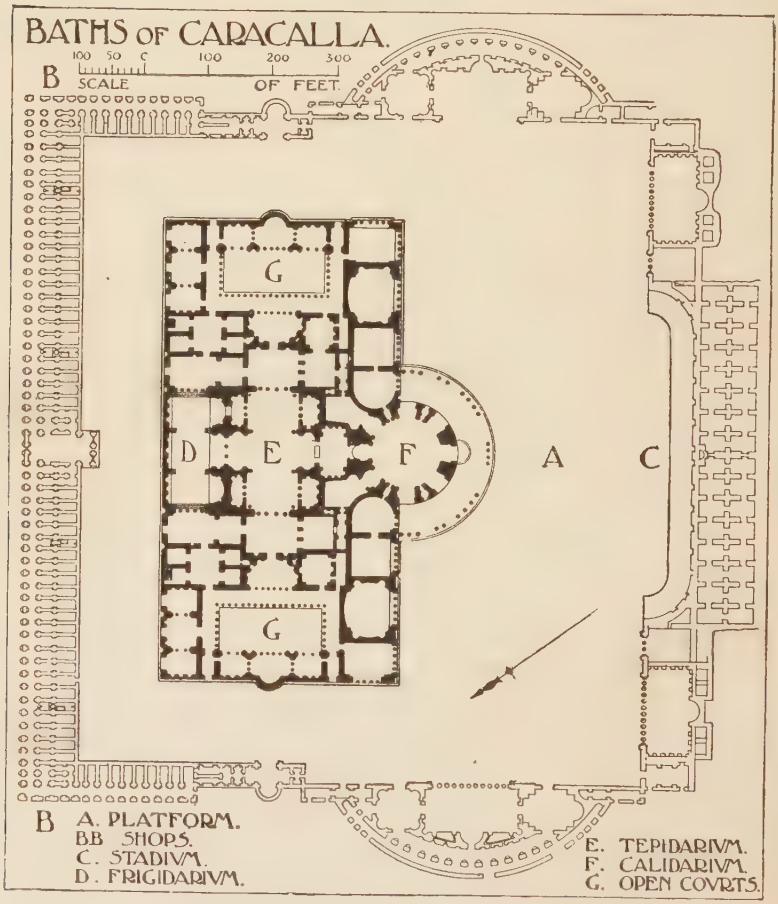


FIG. 93.
Lanciani.

covered an area of about 110 yards square. On the east side at least, and possibly on the other sides also, this platform was

faced by shops two storeys high. Under the main building were vaulted cellars for the furnaces, the slaves, stores, etc. The three principal apartments, the frigidarium on the north side, the tepidarium in the middle, and the calidarium to the south, occupied the central part, and were the entire height of the building. The other portions were two storeys high; the upper rooms being approached by staircases and by passages in the thickness of the walls. The tepidarium was about the same size as the nave of the Basilica of Constantine, and, like it, was covered by three great intersecting vaults of concrete, coffered and decorated in the usual manner. The walls were covered with marble veneer, and in front of the side niches between the big piers were monolithic columns of marble or granite. Similar, but somewhat larger, columns in front of the piers supported the springing of the vault, as in the Basilica of Constantine. The frigidarium was not vaulted, but is said to have been covered, except in the centre where an opening was left for light, by a lattice-work arrangement of iron girders cased in bronze, which formed a flat ceiling. To the south of the tepidarium was a small room, which was possibly the original hot chamber. Some doubt exists regarding the great circular hall beyond, commonly called the calidarium. Middleton thinks that originally it was not a chamber at all, but merely a great semi-circular apse, facing the garden, which was covered by a semi-dome. The present ruins show that, at some time or other, a wall was built to complete the circle, and if the space thus enclosed were ever domed entirely, the result must have been a circular domed hall, 116 feet in diameter, and consequently not far inferior in size to the Pantheon itself. Its position on the south wall was certainly a splendid one for a hot room, as it projected in front, and, consequently, would be exposed to the rays of the sun all day long. The other rooms on the garden side were open with columns in antis in front, which must have formed a striking feature of the exterior.

Baths of Diocletian.

The Baths of Diocletian were even larger than those built by Caracalla, and are said to have provided accommodation for 3200 bathers. Its plan is very similar to that just described. In the sixteenth century, Michael Angelo converted the great tepidarium into the nave of the Church of Sta. Maria degli Angeli, made the barrel-vaulted vestibule alongside it the transept, and retained the circular hot chamber as an entrance vestibule. The nave of three bays, with its original vault, although deprived

of much of its marble coverings and of all its ceiling decoration, affords an excellent idea of the size and appearance of the principal chamber of the old bath. The main block, like that of Caracalla's Baths, was surrounded by gardens, gymnasia, and other buildings, and facing the centre was a huge semicircle, the outline of which is preserved by modern shops built on its foundations. At two corners of the enclosing wall were circular buildings, one of which remains as the Church of San Bernardo. The interior of this, with its old coffered dome, is extremely effective; the only light being from a central eye, as in the Pantheon, which is now covered by a sixteenth-century cupola.

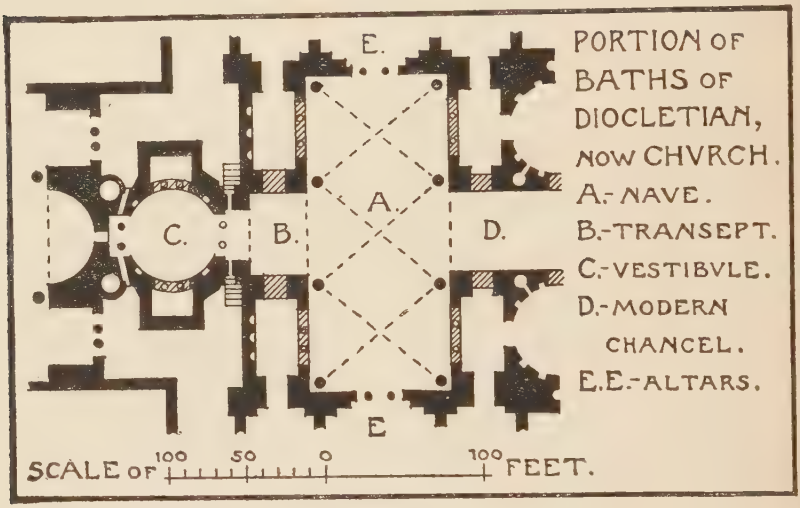


Fig. 94.

Baths of Gallienus.

The building formerly known as the Temple of Minerva, and now generally regarded as a portion of the Baths of Gallienus (*c.* 268 A.D.), is principally interesting for two reasons. The first is that, although decagonal in plan, it is covered by a circular dome; and the second, that each angle of the decagon is strengthened by a buttress built out beyond the external face of the wall. This is one of the very few instances in which external buttresses occur in Roman work. It cannot be said that the Romans did not use buttresses, because all their great vaults are buttressed by cross walls, as in the Basilica of Constantine, but, as a rule, they were careful not to show them. The Romans

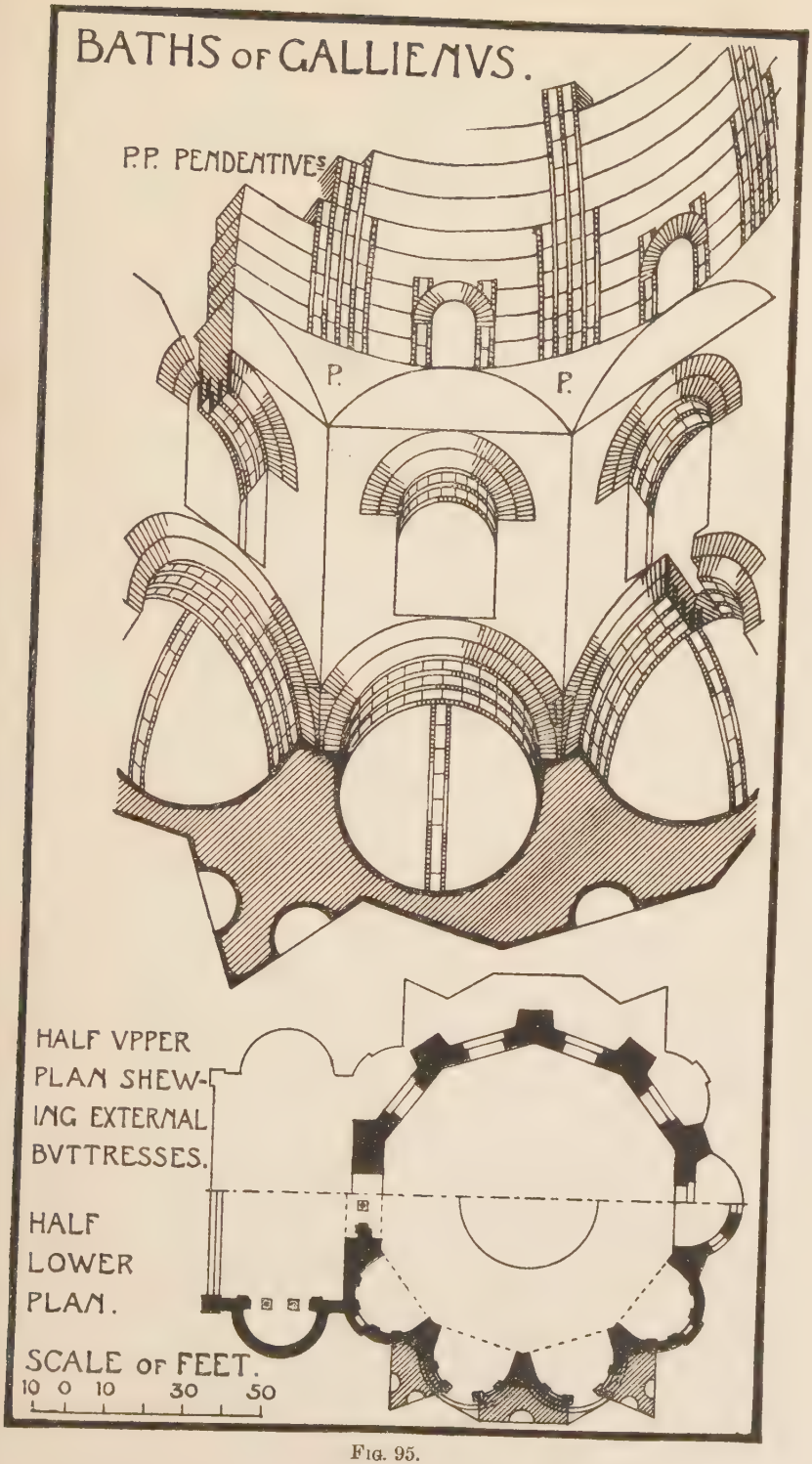


Fig. 95.
Choisy.

seldom placed a dome over a square. In Syria there are one or two small examples of this which are undoubtedly of the time of the Roman Empire, but they were probably due to native traditions. To accomplish this feat on a big scale was an achievement left for the Byzantines; the Romans, so far as is known, did not attempt it. In Hadrian's Villa at Tivoli, however, a large semicircular apse is covered, not by an ordinary semi-dome, but by a seven-sided one, each alternate side being concave. This shows that they were not afraid of departing from the usual simple form, even when there was no necessity for so doing.

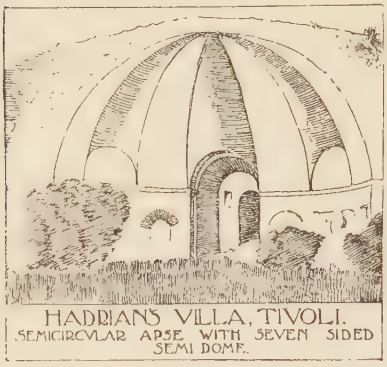


FIG. 96.

Table. The following table gives the approximate internal dimensions of some of the largest vaulted and domed halls.

Name.	Length.	Width.	Height.	Vault or dome.
	ft. in.	feet.	ft. in.	
Basilica of Constantine . . .	270 0	83	120 0	Vaulted three bays
Tepidarium Baths of Caracalla	180 0	78	108 0	Vaulted three bays
Tepidarium Baths of Diocletian	194 0	79	107 0	Vaulted three bays
Pantheon	142 6 (diameter)	—	142 6	Domed
Calidarium Baths of Caracalla .	116 0 (diameter)	—	—	Domed
Calidarium Baths of Diocletian	63 9 (diameter)	—	—	Domed
Baths of Gallienus	80 0 (diameter)	—	90 0	Domed

PLACES OF AMUSEMENT.

Theatres were not so absolutely essential to the Romans as they were to the Greeks, but they built several, and hardly an old Greek one exists which has not been altered by them. The most characteristic of their places of amusement are the amphitheatres and circuses which they built to gratify their love for gladiatorial contests and scenic displays, and for chariot and foot races. These are chiefly remarkable for their great size, for the

immense multitude they could accommodate, and, in some cases, for the historical scenes which took place within their walls; but they are by no means without architectural merit.

Amphitheatres.

No Roman town of any importance, either in Italy, or in the colonies, was considered complete without its amphitheatre. The most important of those existing are at Rome, Verona, Pola, Capua, Pozzuoli, and Pompeii, in Italy; at Syracuse, in Sicily; and at Nîmes, and Arles, in the south of France. In the early days of Rome, the gladiatorial contests took place in the large fora, where temporary seats were erected for the spectators, or else in large amphitheatres built of wood. About the time of Augustus, owing to the great danger from fire to which these were liable, and to the frightful accidents which occurred from time to time from their collapse, stone and concrete were substituted for the more perishable material.

The Colosseum.

The largest and most famous is the Colosseum, built on the site of Nero's "Golden House," by the Flavian Emperors, Vespasian, Titus, and Domitian, and opened for use in A.D. 80. Like all the others, it is elliptical in plan. It measures about 620 feet in length, by over 500 feet in width, and the space for the arena, which is also elliptical, is about 290 feet by 180 feet. Round this are grouped the seats, which rise in tiers one above another, supported by vaults of concrete and by piers of stone. Each portion of the cavea, or auditorium, has its separate entrance, which opens into a wide corridor running all round the building. These corridors occur on each of the main floors; and from them lead many wide staircases which give access to the different parts. Each separate division, each tier, and each seat was either numbered or marked by a letter, and on the tickets of admission were corresponding numbers and letters. The wide corridors and staircases are vaulted by barrel vaults of concrete, enriched with stucco panels and mouldings. Under the arena level were rooms for gladiators, dens for wild beasts, and chambers for scenery and other paraphernalia. The beasts were prevented from jumping amongst the people by low walls round the arena, on top of which were high metal railings, or screens. The entire area of the auditorium was covered by a velarium, or awning, which was stretched from masts fixed on the outside of the building to the top of other masts round the arena, which rested on stone corbels below the ground level. Various estimates have been made as to the accommodation which this building

provided, but, at the lowest, this cannot have been less than 40,000, and some authorities say that it was more than double. Ruined as the interior is, nothing in existence gives such an impression of imposing size; and, apart from all sentimental interest, the power of this building, both inside and out, grips one like a vice. The exterior is four storeys high, and is built of travertine stone in large blocks, held together by iron cramps.

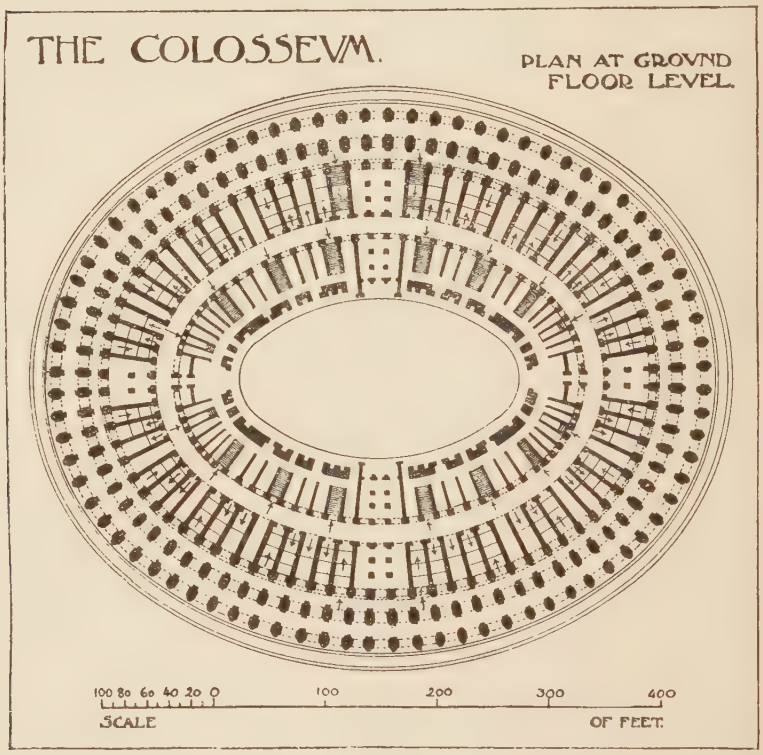


Fig. 97.
Lanciani.

The fourth storey was originally of wood; but was rebuilt in stone in the third century. The three lower storeys follow the typical Roman plan of columns attached to piers which carry arches with entablatures over them in the manner previously described, and the usual superimposition of the "orders" is followed. On each floor are eighty arched openings, all alike, in each of which a statue was placed. The entablatures form unbroken lines,

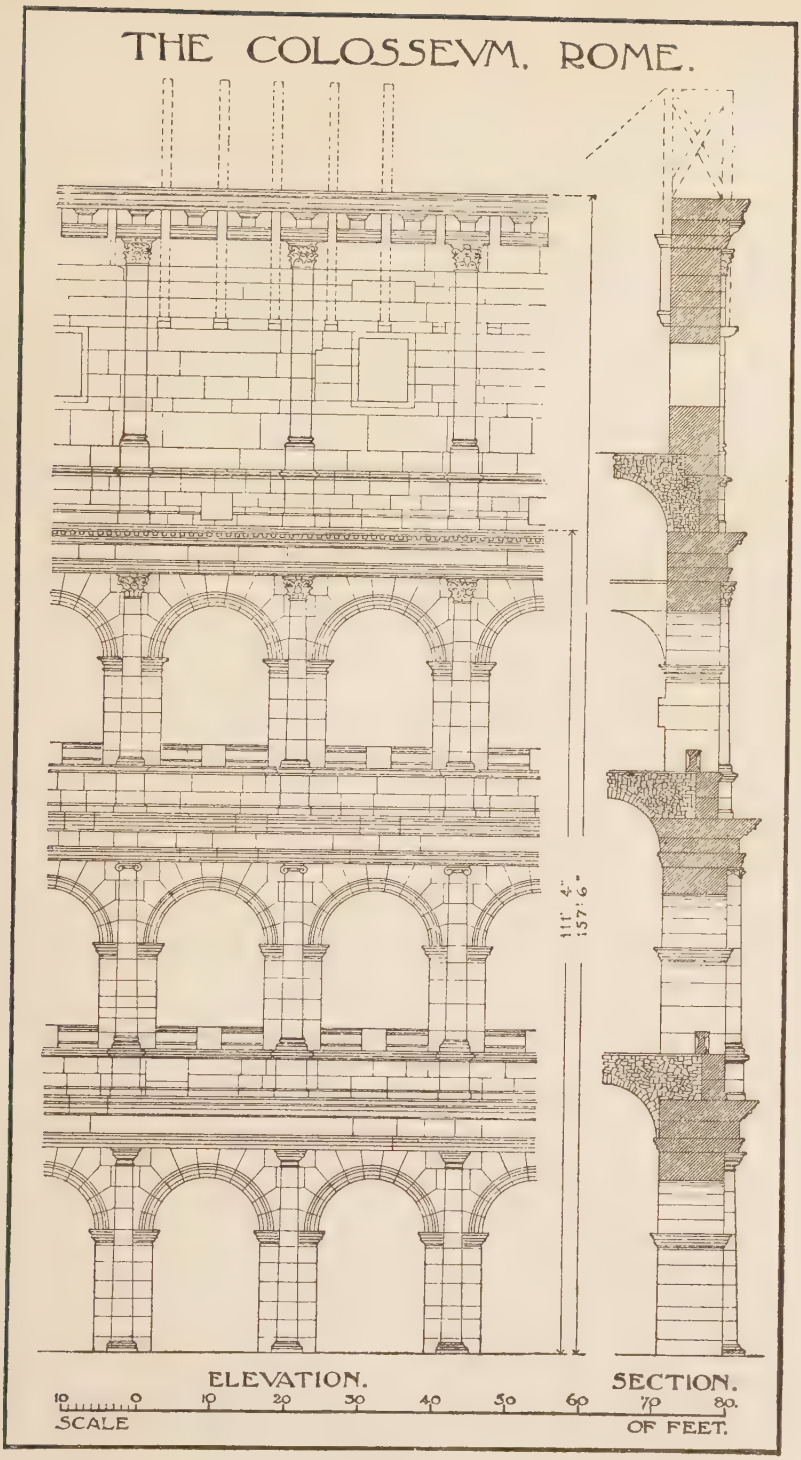

THE COLOSSEVM. ROME.
157'6"
ELEVATION.
SECTION.
10 0 10 20 30 40 50 60 70 80.
SCALE
OF FEET.

Fig. 98.

sweeping round the outside at each floor-level, and, owing to the oval shape of the building, they produce a very fine effect, which would have been entirely lost if they had been broken over each column in the manner affected by later builders. The imposing appearance of the Colosseum is due far more to these fine sweeps, and to the reduplication of its parts, than to its mere size. The fourth storey is different from the other three, as it is not arcaded, and has pilasters instead of three-quarter columns on the wall It is sometimes stated that this storey is too high, and that it spoils the proportions of the building. On paper this appears to be the case, but it is not so in reality; as the projecting stone corbels, on which the masts of the velarium rested, when seen in perspective seem to form a continuous band, and to divide this storey into two parts. The architect has skilfully got over the difficulty of keeping his top entablature proportionate to the pilasters below, and yet at the same time making it appear worthy of the position it occupies as the crown of the building. This difficulty always occurs when two or more orders are placed one above another. The entablature is divided as usual into cornice, frieze, and architrave, but in the frieze are corbels which bind the three parts together and produce the effect of one big cornice.[1] Regarding it in that light, and taking the wall space between it and the velarium corbels below as its frieze, and the corbels as its architrave, the result is one great main entablature which measures about one-ninth of the total height of the building. The face of the wall on the first floor is flush with that below, but the wall above is set back about two feet. The top storey is nearly flush with the second, but owing to the use of pilasters instead of columns a top-heavy appearance is avoided, and the whole building has a slightly pyramidical effect, which is excellent. Of the faults of the Colosseum it is easy to speak, but they are chiefly faults in detail. Delicacy would be lost in such a mass; but excepting for the Ionic capitals on the first floor, which are unpardonably rough, the mouldings and other details are fairly good.

Provincial amphitheatres.

Of provincial amphitheatres, that at Pozzuoli, near Naples, affords, better than the Colosseum, an excellent idea of the working arrangements of these buildings, as, although the upper part is in a somewhat ruined state, the chambers and passages

[1] This "corbel cornice," as it may be called, was used frequently by Bramante and other Italian Renaissance architects in similar positions, and for the same reason.

under the arena level are in a very perfect condition. The plan of the arena floor is also very complete. Forty-two trap-doors, each with its rebated stone curb, follow the curve of the arena on the outside, and other trap-doors are grouped round a long and wide central opening. The steps by which the gladiators and others reached the arena also exist; and altogether this is, after the Colosseum, by far the most interesting of the old amphitheatres (Fig. 99).

Theatres.

Roman theatres differ principally from Greek ones in that they are, as a rule, built up above the ground and surrounded by high walls. The seats are consequently supported on vaults, as in the amphitheatres, and do not rest on the ground as in the Greek examples. There are, however, some exceptions to this, especially in the provinces, the most notable being the Odeum, below the Acropolis at Athens, which was built by Herodes Atticus, an Athenian, A.D. 160. In it the seats are placed on, or are cut out of the rock, which rises behind. Another difference is, that instead of a circular space for the chorus, as in the theatre at Epidaurus, there is only a semicircle in front of the stage, which, according to Middleton "was devoted to the seats of the senators and other dignitaries." The stage in Roman theatres was apparently raised above this semicircle; but not much, otherwise the "dignitaries" could not have seen the actors. In the Odeum, it is raised about four feet, and there are steps up to it from the semicircle which suggest that a close relation existed between the two parts.

Theatre of Marcellus.

The theatre of Marcellus, commenced by Julius Cæsar, and finished by Augustus, B.C. 13, is one of the oldest and most famous of stone-built theatres. It is difficult now to trace the original plan, as much of the building has been destroyed, and the remainder converted into low-class shops and store-houses; but portions of the semicircular wall which surrounded the cavea still remain, and from these it is easy to see that the design is similar in character to that of the Colosseum, but far superior to it in proportion and detail.[1] The outside wall is two storeys high, the lower being Tuscan or Doric, and the upper Ionic (see Fig. 68), and is built of travertine stone, which was covered with hard white stucco in imitation of marble.

[1] The arrangement of columns attached to piers, with arches in between, was evidently a favourite one for places of amusement. The theatre of Marcellus was apparently not the first in which it was employed, as the theatre of Pompey, finished B.C. 52, was, so far as can be judged from very scanty remains, of similar design.

Provincial theatres.

At Pompeii are the well-preserved remains of two theatres, one larger than the other, although neither is of great size. The smaller one is said to have been entirely roofed over. One of the finest and best preserved of provincial theatres is at Orange, in the south of France, where the presence of Greek colonists probably created a demand for dramatic entertainments. The lofty wall at the back of the stage is unpierced, with the exception of a few doorways on the ground floor, whilst above nothing breaks the expanse of wall except an almost flat band of arcading, over which are some courses of stone, in rough imitation of an entablature, and the projecting corbels which supported the masts of the velarium.

Domestic Work.

More is known about Roman domestic work than about Greek, chiefly owing to the discoveries made in the buried cities of Pompeii and Herculaneum; but a great deal still remains, and must always remain, uncertain regarding the lofty buildings which are known to have existed in Rome and in some of the larger cities of Italy. Pompeii was more or less a city of pleasure; and the houses there are no more a criterion of what the buildings in the capital were like, than those in a country village are of the buildings in London.

To the much-abused Nero, who, despite his extravagances and debaucheries, seems to have had grand ideas of how a city should be planned, belongs the credit of passing the first important Building Act to regulate the heights of houses and their materials. This Act and subsequent ones show that many houses in ancient Rome were considerably higher than the majority of London houses are now.[1]

Pompeii.

The ruins of Pompeii are unique, as not only do the houses remain—roofless, it is true, but otherwise in a very fair state of preservation; but the old narrow streets, with the paving-stones worn by the wheels of carts, are just as they were when the city was overwhelmed nearly 2000 years ago. On each side are high footpaths, and at regular intervals down the streets are the

[1] One Act says that houses are not to be higher than twice the width of the street; another limits their height to 60 feet; but Middleton says that some of the walls of the Palace of Caligula on the Palatine Hill must have been 120 feet high or more.

Photo: Brogi.

FIG. 99.—AMPHITHEATRE AT POZZUOLI, NEAR NAPLES.

Photo: Brogi.

FIG. 100.—HOUSE OF PANSA, POMPEII.
(View from Outer Courtyard.)

[*To face p.* 154.

big flat stepping-stones for crossing from one side to the other. In the thresholds of the shop fronts, grooves show where the shutters or railings came, and how the doors opened.

The greater part of the town is laid out regularly, and streets cross one another at right angles, leaving blocks or "insulæ." An important house sometimes almost covered a whole insula, but never entirely, as even the richest men allowed their houses to be partially surrounded by shops, or by smaller houses. The houses vary very much in size; some consist of only two or three rooms, whilst others contain a greater number, with entrance halls and open courtyards in addition, the inner court being reserved for the family. A few had gardens at the back, but this was a rare luxury. Most had originally an upper storey, perhaps more than one, approached by wooden stairs; but in only one instance does this remain. Even in the biggest houses most of the rooms are almost diminutive, one or two alone being of fair size. No rooms, as a rule, open on to the street, but into the courtyards, a single opening, wide and high, serving for both door and window. The lower part could be closed in order to ensure a certain amount of privacy, and the upper part left open for light and ventilation. Windows are met with in one or two instances, but they are little more than slits, widely splayed on the inside, like the one in the house of Epidius Rufus, which in this case opens on to the street. The house of Pansa is one of the largest and best known in Pompeii. It occupies, with its garden, the greater part of an "insula," about 110 feet wide, by about 300 feet long. The entrance is through a vestibule which leads into an outer court partially roofed over, round which are several small rooms. Beyond is the principal court, with its peristyle of columns surrounding a marble basin. Opening out of this are other small chambers, which were probably the bedrooms of the family, and one large room, the largest in the house, which leads to the garden beyond. This and the courts are central with the vestibule, so that any one on entering had a vista through the house and garden, of over 100 yards in length.

Palaces.

The enormous palaces built by the emperors on the Palatine Hill, consist of a series of buildings, some for public entertainments and others for residential purposes, connected together to form one imperial palace. The central part is occupied by the Palace of Augustus, and round it are additions by later emperors, chiefly by Domitian, who built the stadium on one side,

and on the other the throne-room, basilica, state dining-room, etc. These are planned on an immense scale, and from existing remains some slight idea may be obtained of the splendour of their decorations. Of Nero's "Golden House," that stupendous erection which is said to have been a mile in length, little is now visible; but, in the sixteenth century, the discovery of some elaborately decorated rooms which formed part of it suggested to Raphael and others the style of the decorations which they carried out in the loggia of the Vatican, in the Villa Madama, near Rome, and elsewhere. This huge building was hardly finished when, in order to propitiate the people who were exasperated at its erection, the greater part of it was completely destroyed by order of the successive emperors, and on its site were erected the Baths of Titus, the Colosseum, and, later, the Basilica of Constantine and other public buildings.

The palace at Spalato.

The large palace at Spalato, in Dalmatia, built by Diocletian *c.* A.D. 300, is more a town than a palace, as many of the buildings are detached from one another, and streets, flanked on each side by covered arcades, run through it from north to south and from east to west. On the south side, which faces the sea, is the principal room of the palace, a long gallery, 520 feet long, and 24 feet wide. The principal temple, now the cathedral of the town, is octagonal externally and circular internally. On the inside are eight great niches alternately square and semicircular, as in the Pantheon. The dome is of brick, and the lower part of it is curiously constructed "in a succession of relieving arches arranged like scales." [1]

Country houses.

Hadrian's Villa, as it is commonly called, at Tivoli, is a palace worthy of the great building emperor who gave us the Pantheon. Little now remains except the carcases of walls, but these are sufficient to show its vast extent, its construction, and the variety of its buildings. The Roman certainly understood the art of making himself comfortable in the country, as well as in town. A letter in which Pliny describes his seaside villa at Laurentium shows that both aspect and prospect were considered as carefully then as they are now, and that separate rooms were provided for winter and summer. The house included, besides the principal rooms and offices, a small bathing-establishment with a perfuming-room, a sweating-room, small bath-rooms, a warm swimming-bath and a tennis-court. In the garden was a detached building

[1] See Jackson's "Dalmatia," etc., vol. ii.

Photo: Alinari.

FIG. 101.—ARCH OF TITUS, ROME.

[*To face p.* 157.

of three or four rooms, with its own heating apparatus, to which the author could retire "at the feast of Saturnalia, when every other part of my villa resounds with the mirth of my domestics."

Triumphal Arches, etc.

The Romans were great arch-builders. They built arches as entrances to towns, as at Verona, Autun, Reims, and Trier; as approaches to bridges, as at St. Chamas, in France; in honour of some domestic achievement, as at Ancona on the completion of the new quays, or, as at Rimini on the restoration of the Via Flaminia, and as entrances to their great fora. But the most characteristic of all are those erected in Rome, and occasionally in the provinces, in honour of victorious emperors. At one time there were as many as thirty-eight of these in the capital alone. Some triumphal arches consist of one single arch, others of three; in the latter the great central one was for chariots, and the smaller side ones were for foot-passengers. The best of the former class is the Arch of Titus, erected by Domitian about A.D. 87, in honour of Titus and Vespasian, to commemorate the conquest of Jerusalem. The proportions are excellent, and the detail is extremely good and far superior to that generally found in work of this date. The piers on each side of the opening, with their columns, form excellent abutments, and the real and apparent stability of the arch is greatly assisted by the lofty "attic" which occupies about a quarter of the height. The lettering on this is fine in scale, and is a standing proof of how truly decorative lettering is if properly treated. On the jambs of the opening are sculptured panels, representing the "triumph," on which are carved some of the spoils from the temple of Jerusalem, notably the seven-branched candlestick. The best of the triumphal arches with three openings is that built by Septimius Severus, *c.* A.D. 200, which although larger than the Arch of Titus and more profusely decorated, is far inferior to it in both proportion and detail. The greater part of the sculpture and much of the detail of the Arch of Constantine are excellent, but these, including the columns, are taken from a building erected by Hadrian. The sculpture which was executed when the arch was built is exceedingly crude, and shows that the Romans of that time were incapable of doing good work, even when they had excellent models before them.

Columns.

Besides triumphal arches, the Romans sometimes erected columns as monuments of victory. The famous Trajan's Column in Rome is carved with figures, which wind spirally round the shaft representing that emperor's campaigns. All the carving was originally elaborately painted and gilded. The shaft consists of twenty-three blocks of marble, each of which is the entire diameter of the column, and the spiral staircase inside is literally cut through these blocks. The capital is one single piece of marble, 14 feet square and nearly 5 feet high. It would be interesting to know exactly how this heavy mass was raised to the top and placed in position. Another column at Rome erected by Marcus Aurelius, *c.* A.D. 180, is carved in a similar manner, but the relief is too high, and consequently the outline of the shaft is spoilt.

Tombs.

The oldest Roman method of disposing of the dead was by cremation, but about the second century A.D., this custom began to die out amongst the wealthier classes, and the Egyptian method of embalming took its place. The embalmed bodies were placed in sarcophagi of marble or stone, some of which are of rich design. Burial was forbidden within the walls of Rome. This accounts for the numerous tombs, some in ruins, others in a fair state of preservation which line some of the roads outside the town for miles. Many of these are two storeys high, and are domed. The basement contained the sarcophagus, and the upper part formed a chamber in which the friends of the deceased could meet as in the Egyptian tombs.

Imperial tombs.

The Imperial tombs resembled the old Etruscan ones in that the lower part of each was surrounded by a wall of stone, from which rose a large mound of earth. That of Augustus is said to have been planted with trees and laid out with walks as a garden: only portions of the base remain. The most famous is the Mole, or Mausoleum, of Hadrian, commenced A.D. 135, which is now converted into barracks, and known as the Castle of S. Angelo. It consists of a basement and circular superstructure, above which was either a mound, or else a conical marble roof, which made the total height about 300 feet, or nearly as high as the top of S. Paul's, London. The exterior was faced with marble and adorned with statues. The basement and superstructure are solid, as in the old Egyptian pyramids, except for

the central chamber which contained the sarcophagus of the emperor, and the surrounding passages which lead to it. In the Middle Ages other chambers were cut out of the solid concrete mass, and in the sixteenth century many rooms were added at the top.

Eastern tombs.

In the East, the Romans followed the ancient custom of the country, and excavated their tombs in the sides of hills. A few exist at Jerusalem, but those at Petra are the most famous. The fronts of many of these rise to over 100 feet in height, and are ornamented with columns, pediments, entablatures and other architectural features, which are, however, disposed somewhat fancifully, as though the artist felt that a licence was allowable which would have been impossible in an actual building.

Roads, &c.

Before concluding this account of Roman buildings, brief mention should be made of the roads and bridges, and of the methods adopted for supplying the cities with fresh water. The roads made by the Romans are amongst the most marvellous of their engineering efforts. No expense was spared on their formation, and the time and labour bestowed on them seems almost incredible. In every part of Europe, including our own country, their remains are to be found. They ran in a direct line from one ancient station to another, and in the far East to this day they form in many instances the only means of communication between the different cities. They were paved with stone, generally in large blocks, and the distances were marked off by milestones. Eleven important roads radiated from Rome. The oldest is the Via Appia, made about B.C. 310, which ran southwards for about 350 miles through Capua and Beneventum to Brundisium (Brindisi). Far longer was the Via Flaminia, the great northern road, which led through Piacenza and Milan to the territories of Cis-Alpine Gaul.

Bridges.

The Romans displayed as much skill in the construction of their bridges as they showed in the formation of their roads. The bridges in Rome itself — Middleton gives the names of eleven—have in most cases been destroyed or modernized, but portions of some still exist. "Pons Fabricius" (now called the Ponte dei Quattro Capi, because one of the existing original pilasters is crowned by a quadruple head) dates from B.C. 62, and is therefore the oldest. It consists of two semicircular arches

with an opening over the central pier for flood-water. One of the best of the many provincial examples is at Rimini, and was built by Augustus, or by his successor, on the Via Flaminia.

Aqueducts.

The desire of the Romans for a proper supply of fresh water is shown by the vast aqueducts which they built, not only round Rome itself, but also in nearly every city of their dominion. In many cases the water had to be fetched from distant hills, and carried sometimes over flat-lying country, like that which surrounds Rome, sometimes over valleys and rivers, as is the case near Nîmes. At first it was brought underground by pipes, which were generally of lead; Middleton says they were sometimes as heavy as 20 lbs. to the foot, and that most of the lead came from Britain. This was unsatisfactory as the water easily became contaminated, and access to the pipes for cleansing and repairs was difficult. The Romans therefore adopted the method of carrying the water above ground by means of specially constructed water-ways supported on arches and lofty piers. The ruins of these stone built aqueducts rising above the low ground of the Campagna, form the most striking feature to-day round the city. The amount of water consumed in Rome daily is said to have been 340,000,000 gallons, an amount considerably in excess of that supplied to any modern city, notwithstanding the improved sanitary arrangements which are now regarded as essential.[1] The greater part of this went to supply the numerous fountains, which existed in incredibly large numbers in different parts of the city, and which were kept playing day and night in all seasons. A considerable quantity would also be needed for the thermæ, which formed so essential a feature of Roman life in those days. Of the eleven separate aqueducts which brought water into Rome, the two longest and most important were commenced by Caligula, and completed by Claudius in 52 A.D. Each is over 45 miles long, but only about 9½ miles of each is raised on arches. These two aqueducts in some places rise to a height of 100 feet above the ground, and, owing to their fine proportions, simple construction, and apparently endless repetition, possess a grandeur which more ornamented structures often lack. The grandest of all the provincial examples is that bridging the valley of the river Gard, near Nîmes, known as the Pont du Gard. Its length is not great, being under 900 feet, but its height above the water is 157 feet.

[1] In 1900, in London, the average daily supply was 212,000,000 gallons; in Manchester, 32,300,000 gallons; and in Liverpool, 27,400,000 gallons.

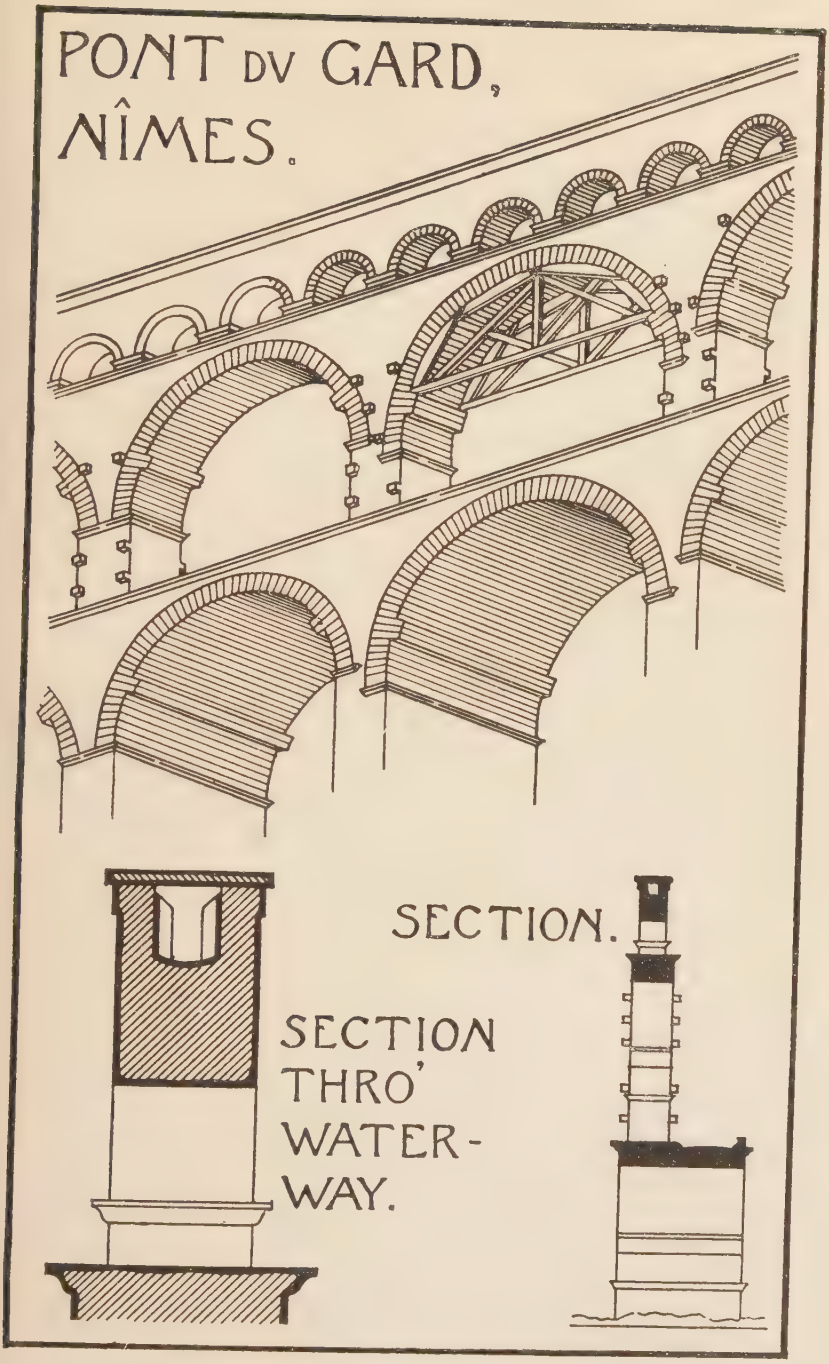


Fig. 102.

It consists of two tiers of arches, each about 65 feet high, and an upper tier of smaller arches 28 feet high, which carries the water-course. The top arches do not centre with those below, the result being far better than if a purely symmetrical arrangement had been adopted. The channel which conveys the water is 4 feet wide inside, has thickly cemented sides, and is covered over by slabs of stone. Altogether this aqueduct bridge is one of the most interesting of the great engineering works carried out by the Romans, and is as much a monument of their greatness as the Pantheon or Colosseum.

CHAPTER VIII.

SASANIAN ARCHITECTURE.

History.

The architecture of the Sasanian kings of Persia is not of sufficient importance to merit a chapter to itself, and yet it cannot be bracketed with any other owing to the position it occupies as the last of the Pagan styles executed when contemporary work elsewhere was Christian. The Sasanians, who deposed the Parthians as rulers of Persia at the commencement of the third century A.D., owed their name to Sasan, a native prince, who claimed descent from the old Achæmenian kings of Persia. Sasan and his successors revived the old faith of fire-worship, and this remained the State religion until the overthrow of the dynasty by Moslem Arabs, between the years 640–650. The Sasanians were a turbulent race, constantly at war with the Romans, whom they defeated on several occasions; and with the Arabs, who finally subdued them. Their dominion comprised Persia, the greater part of Babylonia and Assyria, and portions of Armenia in the north, and of Syria in the west. Their nominal capital was Istakhr, near Persepolis, which seems to have been the chief religious centre, but their actual capital was at Ctesiphon on the banks of the Tigris, about 16 miles from the present town of Baghdad. Owing to the nature of their religion their temples were of no architectural importance, and the only buildings of note, of which remains still exist, are palaces. The principal of these are at Ctesiphon, Serbistan, and Firouz-abad; the two last being south of Persepolis. As far off as Mashita, in the land of Moab, are ruins of a palace which was built under their direction about 620, but probably by Greeks from one or other of the neighbouring cities. The carving on the outside walls is exceedingly beautiful, but is thoroughly Greek in feeling, and some of the capitals are of typical Byzantine design. It is hardly fair, therefore, to class this building as an example of Sasanian work.[1]

[1] For photographs and drawings of the carvings at Mashita, see M. Dieulafoy's "L'Art Antique de la Perse."

The palaces.

In plan, the Sasanian palaces are very different from those of the old Achæmenian kings of Persia, with their halls of many columns covered by flat ceilings, and bear much greater resemblance to the Assyrian palaces. They consist of many chambers ranged alongside one another, all of which are barrel-vaulted or domed. At Serbistan, squared stone was used for the walls, the dome alone being of brick; at Firouz-abad, walls, domes, and vaults are all of stone; but at Ctesiphon, light-coloured brick of large size was employed throughout.

Serbistan.

The chief feature of the palace at Serbistan, which is generally regarded as one of the earliest of these monuments, dating

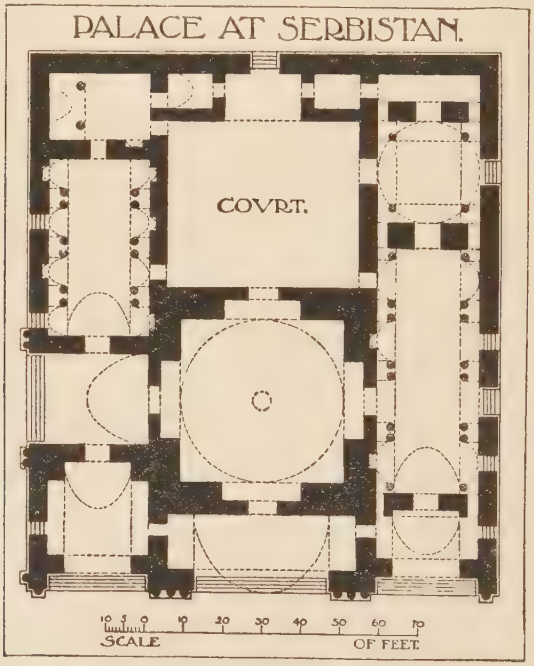


Fig. 103.

perhaps from the fourth century A.D., is a square central hall, 42 feet wide, covered by a dome. This is approached in front through a somewhat shallow elliptical vaulted porch of the same width as the hall, and at the side by another porch of less span. Behind the domed hall is an open courtyard, on each side of which are long galleries and other chambers.

The galleries are divided into bays by coupled columns, and are covered by longitudinal barrel-vaults, the thrusts of which are ingeniously counteracted by the semi-domes over the side bays between the columns. The columns are barely 6 feet high, are rough in execution and unfluted, and very different in proportion and appearance from the lofty slender ones in the halls at Persepolis, erected by the earlier dynasty. Their capitals are plain blocks unmoulded and uncarved, and it is evident that columns and capitals were originally covered with plaster.

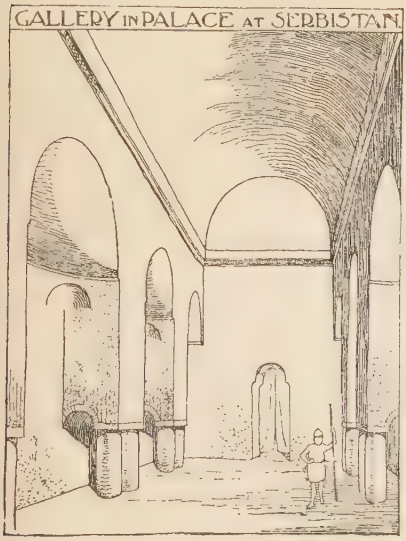


Fig. 104.

The palace at Firouz-abad is larger, and contains three domed halls side by side, each of which is slightly wider than the single one at Serbistan. The building is principally interesting for the remains of plaster decoration which still exist on the internal walls, round the niches and the arched openings. At the sides of each niche or opening are pilasters which stop at the springing with a moulded capping, and round each arch is an archivolt moulding. An outer architrave frames in the whole, and above it is an enriched cornice similar in section to the Egyptian "gorge," and to the cornices of earlier Persian buildings. Firouz-abad.

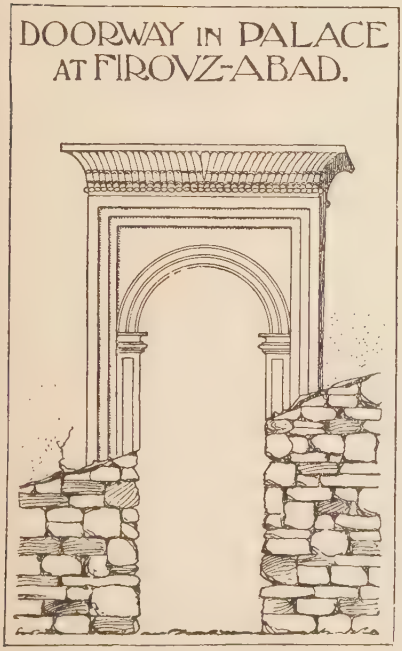


Fig. 105.

The date of the palace at Ctesiphon.

Ctesiphon is well known, as it was built by Chosroes I. (Khosran), the most powerful of all the monarchs of his race, who reigned from 531 to 579. Only a fragment of it remains, but that is sufficient to show that it was by far the most magnificent of Sasanian palaces. This consists of a porch, open in front, which is stated to have been the throne-room of the palace, and portions of the walls flanking it. The porch, according to Mr. R. Phené Spiers, is 86 feet wide, 163 feet long, and 105 feet high, and its side walls are nearly 24 feet thick.[1] It compares well in size with the great halls of the Roman thermæ,

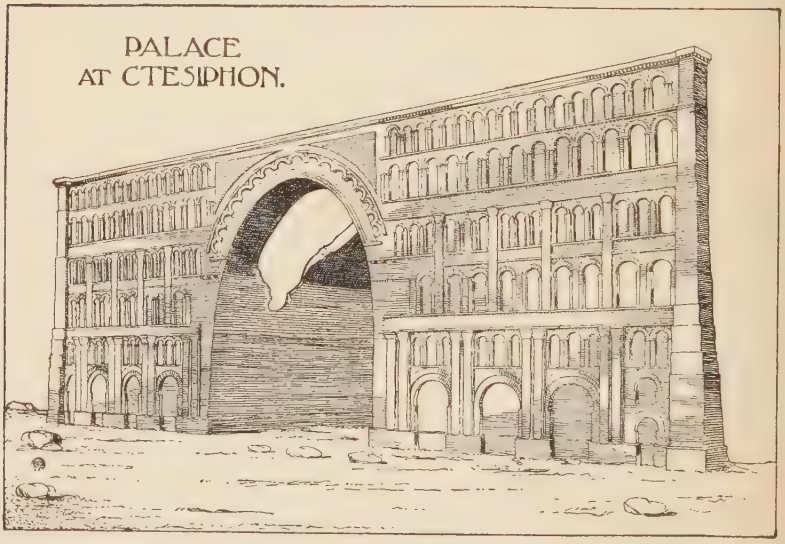


FIG. 106.

and differs from them merely in the nature of the vault which covers it. This is a barrel vault, elliptical in section like most ancient vaults in the East, where that form was generally adopted, as it possesses greater strength and exercises less thrust than the semicircular. It is constructed in much the same way as Egyptian and Assyrian vaults of similar shape. To about one-third of its height the bricks are laid with their beds horizontal, so as to diminish the span and obviate the use of centering for the lower portion, and above that level are four or five rings of

[1] The dimensions given by M. M. Flandin and Coste, in their "Voyage en Perse," 1843-54, are considerably less than these, being only 74 × 115 × 92.

bricks placed edgewise (see Fig. 18). The face of each slice of the vault is not quite vertical, but slopes backwards a trifle, so that each layer affords some slight support to the next. This vault is only one instance out of many showing that traditional methods of construction prevailed in Eastern countries for centuries and centuries. If behind the porch there was a square hall covered by a dome—which, judging by the other examples, seems likely—the dome must have been wider than any known Byzantine one, except that of S. Sophia, Constantinople, with which church this building is contemporary.

Pendentives.

In none of these palaces is the true pendentive to be found.[1] The Sasanians at Serbistan and Firouz-abad got over the difficulty of placing a circular dome over a square hall by means of semi-domes in the corners, consisting of rough corbellings which were plastered to a smooth face. This form of "squinch" arch, or pseudo-pendentive, was probably the earliest method of overcoming the difficulty, and it is one which was frequently adopted by the Romanesque builders in the eleventh and twelfth centuries in Italy and France, and in many of the Byzantine churches in Greece and Turkey of the same date. It is not so scientific as the true pendentive, but these examples show that it can be employed in domes of considerable span.

Cylinders.

In some of the vaults and domes of the palaces are inserted a number of cylindrical tubes which Flandin and Coste state were for ventilation, but which M. Dieulafoy says were intended to give light. These cyclinders are interesting, as they are not unlike those discovered by M. Place in the ruins at Khorsabad, which he claims were used in similar positions for either one or the other purpose. Mr. Spiers suggests that they were to pass cords through from which lamps could be hung, and this seems probable, although they may have served other purposes as well.

External treatment.

In the treatment externally of the buildings, both Eastern and Roman influences are apparent. The walls at Firouz-abad are decorated with rounded pilasters, or half columns, which reach from the ground to the cornice, and between them are long, shallow, arched niches. The design is very similar to that on Assyrian palaces. On the other hand, at Ctesiphon, the pilasters are in stages, and are divided from one another horizontally by string courses, suggesting the column above column, and the entablatures of the Romans.

[1] For diagram of pendentives and pseudo-pendentives, see Fig. 143.

CHAPTER IX.

EARLY CHRISTIAN ARCHITECTURE.

Introduction.

The edict of Constantine in 312, legalizing Christianity, divides Pagan architecture from Christian. A few years later, the Roman Empire was definitely divided into two parts, the Eastern and the Western, the former with Constantinople, and the latter with Rome as its capital. These two events coinciding in date, had an important influence on subsequent architecture. The work that follows immediately is difficult to arrange satisfactorily, because one style was no longer universal over the whole of the civilized world, and yet the buildings of the various countries have not sufficiently marked differences to allow them to be regarded as belonging to independent and distinct schools. Local traditions were allowed to influence architectural development to a far greater extent than had been possible in the days when the Imperial stamp was set on all buildings, whether at Rome itself; at Palmyra, in the East; at Nîmes, in the West; or at Trier, in the North. This gives an interest, and at the same time an importance to some of these examples, especially to those which belong to the first few centuries after the proclamation of Constantinople as the Eastern capital, which their architectural merit in many cases hardly warrants. Their chief value is, that they are stepping-stones connecting the vast buildings of ancient Rome with the later masterpieces of Byzantine and mediæval art.

At first, there was little or no difference between the architectural work of Western Europe and of Eastern Europe, Asia Minor, and Egypt. The old Roman traditions still dominated all building; but towards the end of the fifth century, the Greek artistic feeling, the influence of which through the centuries of Roman supremacy had always been considerable, found at Constantinople, under the Eastern emperors, opportunites for free expression far greater than it had previously enjoyed. The result was a great revival of art, which culminated in the sixth century

in the building of S. Sophia, Constantinople, and in the consolidation of existing methods of construction and ornamentation into what was practically a new style, possessing strongly marked characteristics. This Eastern style, by common consent called the Byzantine, owed much to the Roman traditions introduced by Constantine; but these were modified and beautified by the Greek architects and artificers. Its traits spread quickly through all the towns and districts which were under Eastern rule. Moreover, they tinctured strongly the work in the West. The result was, that in both the Eastern and Western worlds the new ideas mingled with the old to such an extent that it is often impossible to separate them. If one regarded detail as the sole guide by which a style can be determined, there is little doubt that, even in the West, practically all work for many centuries should be termed Byzantine, as Greek artificers were responsible for nearly all the carvings and decorations, except those which were taken from old buildings. But construction is more important than detail, and also affords a far sounder basis on which to frame satisfactory divisions. It is, therefore, better to group buildings chiefly according to their planning and construction, and to regard detail as subordinate. That this will occasion slight inconsistencies is undoubted, but none of great moment. At Ravenna, for instance, are two churches built at the same time, under the same Government, and perhaps by the same workmen, and yet one of them, San Vitale, is pure Byzantine, whereas the other, San Apollinare in Classe, although Byzantine in detail, is thoroughly Western in all other particulars, and therefore belongs to another class. By this method of division, also, a strictly correct chronological order cannot be maintained. That, however, may well be sacrificed, if by doing so, architectural development can be better traced, and the practical lessons which the buildings can teach be more easily demonstrated.

In many of the countries which formed part of the old Roman Empire no Christian work is found for many centuries after the time of Constantine. The Western and Northern provinces had, even before the fall of Rome in 476, relapsed into barbarism. In Persia, as was shown in a previous chapter, a new race of native rulers had returned to the old religion of the country, and their work, in consequence, has little or nothing in common with Christian art.

Syria and Egypt.

In Syria and Egypt, however, it was different. Some of the earliest churches in existence are to be found in those countries.

The history of Syria is soon written. Peopled chiefly by Greeks, a style of considerable beauty and originality was evolved there, which, if fully developed, might have had great effect on Christian architecture throughout the world. Unfortunately, the invasion of the Saracens, in 639, completely put an end to all building, and surrendered the country into the hands of the infidel. Egypt fared little better. Christianity found early favour there, and churches were undoubtedly built by the Christian Egyptians, or Copts, before the end of the second century, but the havoc wrought by the Saracens in the seventh century was as complete as in Syria. The result is, that nearly all old Christian churches in these two countries date from before then.

Italy.

The history of Italy from the fifth to the end of the eighth century is the history of a long series of disasters. The fall of Rome and the collapse of the Western Empire had little to do with the general depression, as the Eternal City had long before lost her prestige. Under Theodoric, King of the Visigoths, who ruled Italy between the years 493 and 526, there was a lull in fighting and a slight revival in the arts, but the peace he brought did not last long. In 568 the Lombards, a barbarian race, overran the greater part of the country, and for 200 years the whole of Italy, except Rome, Ravenna, and portions of Venetian territory, remained in their possession. In addition to this disaster, plagues and famines towards the end of the sixth century swept away a large number of the inhabitants. The end of the eighth century saw the fall of the Lombards, the unification of the different European nationalities under Charlemagne, and the rise of the papal power under the Popes Adrian I. and Leo II. (772–816). Charlemagne was crowned by the latter in 800, under the title of Emperor of the West. The work which follows might almost be called Papal, as the recrudescence of building activity was largely due to the influence of the popes, although the revival was assisted by the more settled state of the country under Charlemagne's rule.

Greek influence.

Before proceeding to the consideration of early Christian buildings in the East and in Italy, brief mention ought to be made of the influence exercised by Greek workmen in the latter country from the fifth century onwards. This was even greater than had been the case in the days of Imperial Rome. The churches built entirely by them will be considered later, when dealing with Byzantine art, but apart from these, throughout the length and

breadth of the country, many others still exist which, although planned and constructed on old Roman lines, are full of examples of Greek craftsmanship. The early Christians freely made use of old material, especially of columns and capitals, but when these failed Greek workmen were called on to supply the deficiency. As carvers of capitals, sarcophagi, screens, and other fittings they were supreme, and although in the eighth and ninth centuries Italian workmen attempted to imitate their work, the differences between the two are great and easily discernible. To them is due the introduction of the "dosseret," or block over the capital from which the arch springs. This is essentially a Byzantine device, employed first in the East to overcome the difficulty of satisfactorily supporting a wall whose width is greater than that of the capital below. In Italy it was even more necessary, because many of the capitals, being old ones purloined from other buildings, were much too small. In Rome it was first used, in the eighth century, in the Church of S. Stefano Rotondo, although at Ravenna, the centre of Byzantine influence in Italy, it had been employed two centuries before.

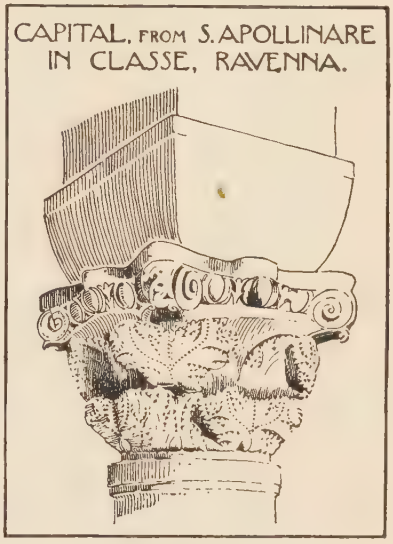


FIG. 107.

Much of the mosaic work in Italy is also of Greek workmanship. This art had its origin in the East, and although it had been practised by the Romans in the days of the Empire, the great extent to which it was employed in Italian churches was due to the fondness of the Byzantine Greeks for this most effective and durable method of decoration. The earliest work—that of the fifth and sixth centuries—is the finest; in the centuries immediately following the art declined, but many of the later mosaics of the tenth and eleventh centuries are little, if at all inferior, to those of the first period.

Character of buildings.

An important difference between the buildings of the old Empire and those now under consideration, is that most of

the former are secular, whereas the latter were built almost entirely for the purposes of the new religion. In Syria, however, there are important remains of domestic buildings, which, although as a rule roofless, are otherwise in a very good state of preservation. New secular buildings were not required in Rome and in other Italian cities, as the existing ones, shorn as they were of much of their splendour, and no doubt partially ruined by the barbarian invasions of the fifth and sixth centuries, more than sufficed for the diminished population. In Constantinople, it is true, Constantine erected vast public buildings worthy of "New Rome," but these have practically disappeared. Their destruction was due partly to disturbances early in the sixth century, when many churches built by Constantine were burnt, and partly to careless construction, owing to, as historians have recorded, the great haste in which they were built. The result is, that almost the only buildings which have been preserved in any country are churches, baptisteries, and a few tombs.

Early churches.

It is sometimes supposed that no Christian churches were erected before the legalization of Christianity in 312. That this is a mistake is proved by edicts published by different emperors, notably one by Diocletian, in 303, commanding that all churches should be destroyed and all Christian books burnt. Dr. Butler, in his book on Coptic churches in Egypt, mentions other and earlier proclamations. According to G. G. Scott, Junior,[1] many of the pre-Constantinian churches were of no mean importance. His argument regarding the plan of the early church is, that originally it consisted of an oblong room, beyond which, separated from it sometimes by an arch, was another and smaller chamber. The ritual in the early days was very simple, and no actual division existed between clergy and laity. The first addition was the apse, which was set apart for the clergy, and afterwards screened off. In front of this stood the altar. One of the rock-cut churches in Cappadocia is an example of this simple plan. When a church was demanded of larger size, the area was divided into three divisions, *i.e.* central nave, and side aisles, for the same reason as Greek temples and Roman basilicas were so divided, namely, the difficulty of bridging over wide spans without intervening supports. A large church at Tyre, which existed before the time of Constantine, seems to have been of this type.

[1] "Essay on the History of English Church Architecture."

In consequence of the similarity in construction and plan between the large churches and some of the old Roman basilicas, it was formerly supposed that converted basilicas formed the earliest Christian churches. Texier and Pullan, however, in their "Byzantine Architecture," state: "We know of but one instance in which the Roman basilica was transformed into a church. This was the Licinian Basilica, at Rome, which was converted in the year 370" (now known as S. Maria Maggiore). Scott ridicules entirely the idea that basilicas were used for Christian worship. He advances the practical objection, that they were as necessary as before for the purposes for which they were built. He says: "Christianity unfortunately could not abolish the litigious instincts of our nature, and after fifteen centuries of the gospel the legal profession still flourishes." Converted basilicas.

Although basilicas were not converted, it is certain that old temples were. Not at first perhaps. The old religion had its followers for a few centuries later, and it is also possible that for some time prejudices existed against the use of temples for Christian worship. But as these died out, no reasons existed why the temples should not be converted. Only small alterations as a rule were necessary to render them suitable. Mention has been made in previous chapters of temples, both Roman and Greek, which were utilized, and many more might be instanced in different parts of Asia Minor, in Italy, and in the south of France, if it were necessary to do so. Converted temples.

The most interesting example is probably the present Cathedral at Syracuse, in Sicily. This was converted into a church in the seventh century, and into a mosque in the ninth; the double change being no unusual occurrence in Southern Italy and in the East. The principal alterations made in the seventh century were to build a wall between the columns of the external peristyle at the sides, so as to enclose the old ambulatory which thus became the aisles, and to pierce narrow, low, semicircular-headed openings through the walls of the cella in order to connect the aisles with the central part, which became the nave. In addition, the columns of the pronaos were removed, and the cella walls continued eastward to form a chancel. On the north side, the old marble columns of the peristyle, with their Doric capitals, show externally as well as internally, and above them are portions of the original entablature, crowned by Saracenic battlements. The changes made in other temples, as a rule, were Cathedral at Syracuse.

similar. An exception is at Amphrodisias, in Asia Minor, where, according to Texier and Pullan, the temple on its conversion in the fourth century was very greatly enlarged by completely

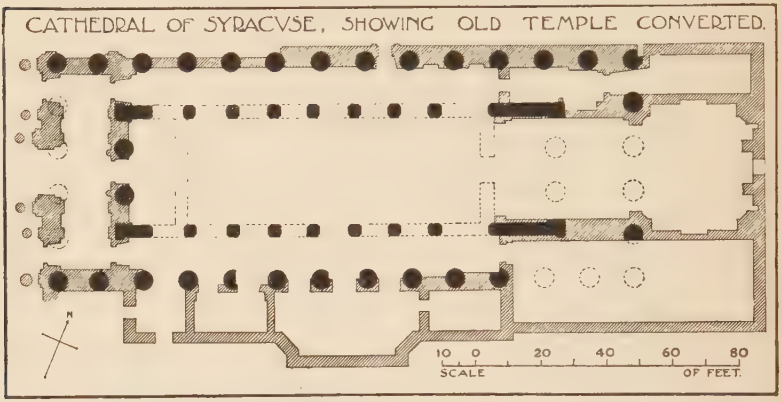


FIG. 108.
Koldewey & Puckstein (Asher).

demolishing the cella walls, and by building aisles *outside* the external peristyle, which thus became the internal colonnade.

The Basilican church.

For the first century or two after the time of Constantine only a few of the temples, and those probably the least important, would be available for Christian worship. This was especially the case in Rome, where the old Pagan religion lingered longer than in any other part. New churches had to be built, and these were planned and constructed in such a way as to accommodate the greatest number of people at the smallest possible expense. Whether they were copied deliberately from the basilicas, as urged by some and denied by Scott, is immaterial. Many points in plan and construction are the same in both basilica and church; the apse at the end, the wooden roofs, and the columns dividing the nave and aisles. But it must not be forgotten that the temples, which undoubtedly were converted into churches, also possess many of these characteristics. Roman temples often have the apse; Greek temples the wooden roof and the division into nave and aisles. Moreover, if what Scott contends be true, that the central portions of the large Roman basilicas, such as the Basilicas Ulpia and Julia, were not covered over at all, then the likeness between them and the early churches becomes but slight. The term "Basilican Church" was never used by old writers,

and probably its adoption later arose, not so much from any resemblance between the early church and the Roman basilica, as from the erroneous idea that the early church was the basilica converted. Be that as it may; much may be said for the term if it be properly defined and restricted; but if used loosely, as it sometimes is, and applied to any large church which has nave and aisles, irrespective of the other features of the plan, of the method of construction employed, of the manner of roofing, and of the detail, it becomes worthless and meaningless. It is absurd to apply it to buildings so different as S. Paul's outside the walls, Rome, Amiens Cathedral, and S. Peter's at Rome.[1] A true Basilican

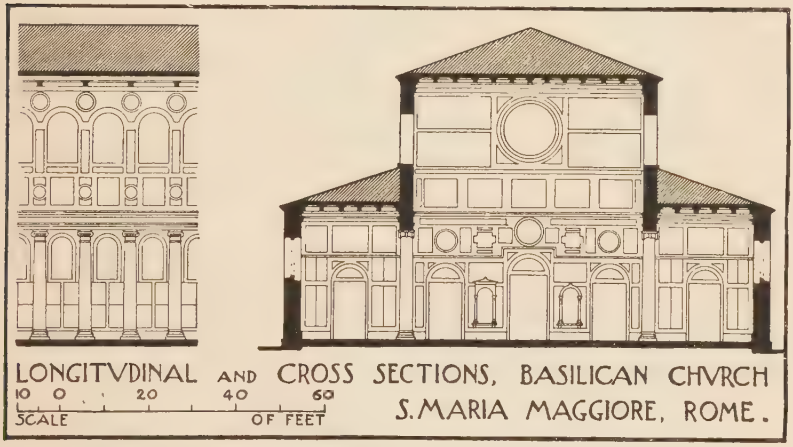


Fig. 109.

church may be defined as oblong in plan, not cruciform, lateral projections, if any occur, being very slight ones at the extreme end. Further, it is divided into nave and aisles by columns, not by piers; is covered by timber roofs, the central one of which is higher than the side ones; and has an apse at the end of the nave, called the "bema," or presbytery. The walls are only of sufficient thickness to keep out wet, heat and cold, and to carry the roof, and not sufficiently strong to support a vault.

Development of plan.

One of the first additions made to the simple plan was a portico, or narthex, at the entrance, the entire width of the nave and aisles, for the use of the catechumens, penitents, and others, who were not eligible for admission into the

[1] Letarouilly's great work is called "La Basilique de S. Pierre."

church itself, but who, through the three doors opening into the church, could hear portions of the service. In some of the early churches in Rome, such as S. Agnese, and the original San Lorenzo, the side columns which divide the nave from the aisles

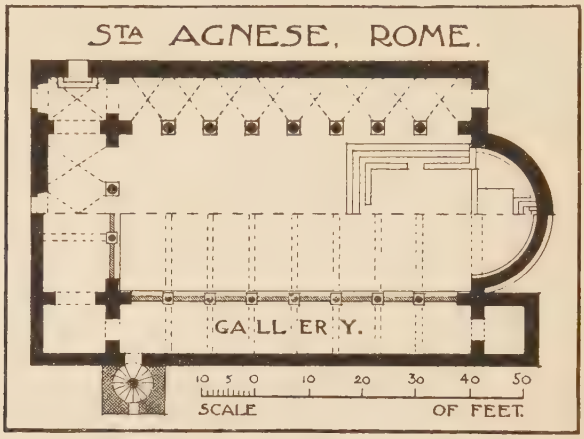


FIG. 110.

are returned across the entrance end so as to form a western aisle; this was also a favourite arrangement with the early Copts. These two churches have galleries over the aisles for women—an unusual addition in Western churches, although universal in

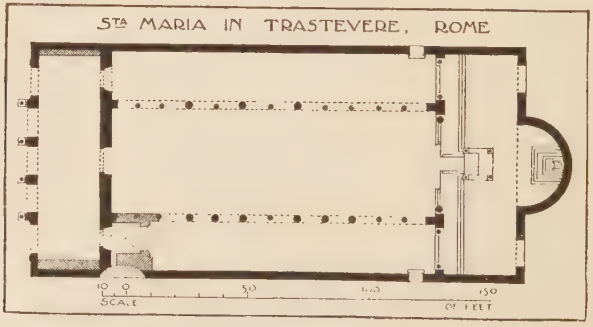


FIG. 111.

Eastern ones. The other alterations and additions which were made from time to time in the plan were in nearly all cases due to ritual developments, and to the ever-increasing number of the clergy, who required additional accommodation. In large

churches, and also in some of the smaller ones, a transept was introduced between the apse and the body of the church, which stretched across from north to south without a break. It was generally the same height as the nave, from which it was separated by an arch, known as the "triumphal arch." The reason for the transept was to provide extra altars, which were placed sometimes at the ends, sometimes on either side of the central apse.[1]

In many of the later churches in Rome, each aisle terminates in an apse, as well as the nave, thus making the end triapsal. This plan was common in the Coptic churches of Egypt from a

Triapsal plan.

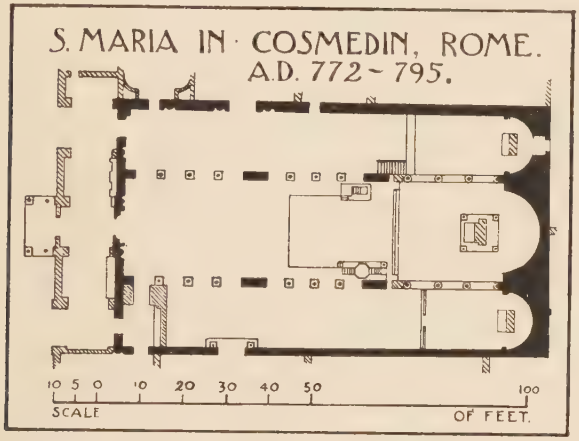


FIG. 112.

Cattaneo. Architecture in Italy from the 6th to the 11th century (Fisher Unwin).

very early period, but was not introduced into Italy until the eighth century. S. Maria in Cosmedin, Rome, is one of the earliest of the Italian examples.

In early churches one or more semicircular tiers of seats, in marble or stone, were built for the clergy round the central apse, and the chair for the bishop, or chief priest, occupied the central position, and corresponded to that of the magistrate in the apse of a basilica. Seats of this description still exist

The chancel.

[1] The Italians in most of their later churches adhered to this eastern position for the transepts, whereas, in churches in England, France, and Germany the transepts are more central, and project beyond the aisle walls, making the plans cruciform.

at Torcello, in the Venetian Lagune, although much spoilt by modern restoration, and in many of the Coptic churches in Egypt. The lesser clergy and the choir were accommodated in front of the principal altar in a portion of the nave which was enclosed by low walls. Examples of this arrangement occur at San Clemente, and in S. Maria in Cosmedin, Rome, which will be more fully described later, but the desire of the clergy for increased privacy led gradually to the chancel becoming entirely distinct from the nave. At San Ambrogio, at Milan,

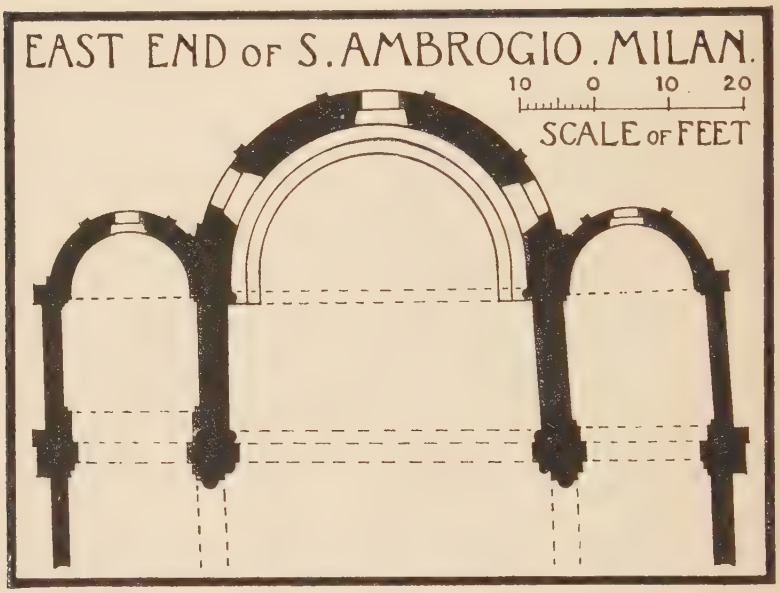


FIG. 113.

the east end of which dates from 824-829, and at a church at Alliante, Brianza, of about the same period, walls project into the church at right angles to the east wall, so that the portion reserved for the clergy is entirely enclosed at the sides. The custom of burying the dead in crypts[1] under churches occasioned one of the most effective features in many of the later Italian churches, namely the raised chancel. In the Church of S. Apollinare in Classe, Ravenna, built in the sixth century, is an early example. Under the apse is a small

[1] Burial in crypts became general in the sixth century.

chamber approached from either side by a narrow passage which follows the curve of the wall of the apse (see Figs. 124, 125).

In front of each church was generally a courtyard, or atrium, surrounded by cloisters, with the narthex at one end. In the centre of the courtyard was often a fountain, which in early days was used for ablutions. Many of these courtyards have been destroyed, but that of S. Clemente, Rome, still remains. In many instances the baptistery occupied a position at the end of the courtyard facing the narthex, as at Parenzo, in Istria, and at Novara, in Northern Italy. Baptisteries in this position also exist at Pisa, and Florence, but in both these examples the walls and cloisters of the intervening atrium have been removed

Atria.

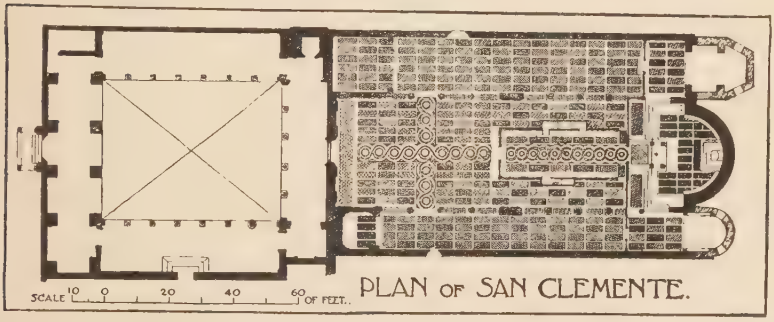


FIG. 114.

and only the open space remains. At Torcello, near Venice, the baptistery is immediately in front of the west door of the church, from which it is separated only by the width of the narthex. Baptisteries, however, did not always occupy this frontal position. Sometimes they were at the side, as at Zara, in Dalmatia, and at Grado, in Istria, in which case they were generally connected with the church by a passage. It is worthy of note that, in all early churches in Italy, the principal doorways are at the west end, which undoubtedly is the most dignified position for them.

The orientation of many of the early churches in Italy is the very reverse of what is now customary. In Egypt it is different, as most of the Coptic churches have their entrances at the west, and their altars at the east, but in Rome forty out of the fifty early examples show the opposite. These include such

Orientation.

important churches as S. Peter's, S. Giovanni in Laterano, S. Maria Maggiore, S. Clemente, and S. Maria in Trastevere. The original Church of San Lorenzo followed the others in this respect, but its orientation was changed during the alterations in the thirteenth century. The old basilican church of the fourth or fifth century at Salonica, the church at Amouna, in Algeria, and that of the White Convent, in Upper Egypt, also have their altars at the west end.[1] On the other hand, S. Paul's, S. Agnese, and S. Maria in Cosmedin, all in Rome, have their altars at the east. Of these, however, only the first is of very ancient foundation, and the position of the altar in this church is stated to be due to alterations made in the seventh century. The change in orientation seems to have commenced in the fifth century, and after then the eastern position became general. S. Agatha, at Ravenna, built in 417, is quoted as the first to have had the altar at the east end. The fact that in Rome so many churches follow the opposite plan is probably the reason why in Catholic countries now the orientation of churches is regarded as of little account.

Re-use of old materials.

The practice of using old columns and capitals for the nave arcades, which was so general in Italy until the twelfth century, except at Ravenna and in the Venetian lagunes, accounts for the unsatisfactory proportions so conspicuous in many of the basilican churches. The columns and capitals are often very fine in themselves, the capitals being of marble beautifully carved, and the columns monoliths of either marble or granite. But the latter rarely agree with one another either in height or in diameter, and the differences have to be made good, in some cases by raised bases, in others by omitting the bases altogether. The capitals are often of different orders; it is no uncommon thing to see Corinthian and Ionic capitals side by side in the same church; and even when all are of the same order they are often strangely unlike one another. In some churches a good effect is produced by the introduction at regular intervals of piers, instead of columns. In San Clemente, Rome, a single pier divides the arcade on either side into two divisions of five bays each, and at S. Maria in Cosmedin, each arcade has three divisions of four bays each, separated by two piers (see Figs. 112, 114). The reason for these piers is not quite clear;

[1] Scott says that the original church at Canterbury, restored by S. Augustin, had its entrance at the east, and its altar at the west.

they may have had something to do with the ritual arrangement, or perhaps they were merely introduced because long ranges of columns had come to be regarded as monotonous. This was undoubtedly the reason for their introduction at San Prassede, Rome, where, in the twelfth century, some of the old columns

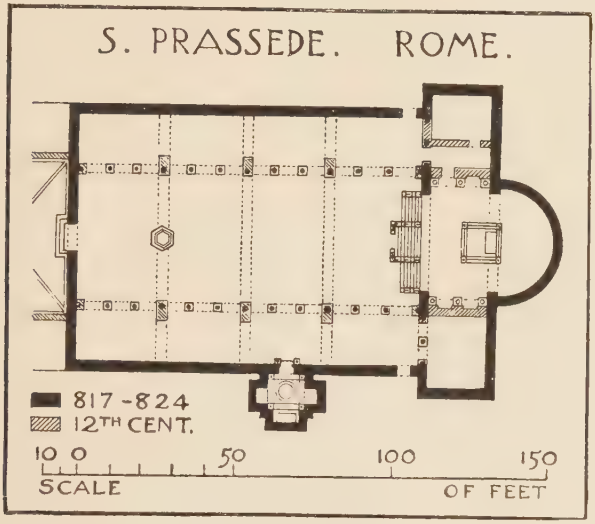


FIG. 115.
Cattaneo (Fisher Unwin).

were converted into piers, from which arches were thrown across the nave and aisles, so as to break the vistas longitudinally.

Lintels or arches.

The openings between the columns and piers are sometimes spanned by lintels, sometimes by arches. Of churches in Rome, old S. Peter's, S. Maria in Trastevere, S. Maria Maggiore, and S. Lorenzo, are examples of the former method, which was probably the earlier, and S. Paul outside the walls, S. Agnese, S. Sabina, and the galleries of S. Lorenzo, of the latter. The lintels are generally moulded so as to form entablatures, proportionate to the height of the columns, as at S. Maria in Trastevere. When the spaces are arched, cornices, and sometimes whole entablatures, are placed above the arches, as in late Roman work.

Lighting.

The windows in basilican churches are large and numerous (they are now mostly blocked up) and were filled originally with a lattice work of bronze, or with pierced slabs of marble,

alabaster or plaster, such as will be described under Byzantine work (see p. 222). Some of these slabs still exist in S. Maria in Cosmedin, Rome, and in many churches in South Italy, at Bari, Trani, etc. Windows were not filled entirely with glass until the ninth or tenth century, when as a consequence they became much smaller.

Mural decoration.

The basilican churches, especially those in which lintels and not arches occur, offer a greater expanse of unbroken wall surface for decoration than is found in churches of any other type. The broad band under the windows, between them and the entablature, and the spaces between the windows themselves, were either covered with paintings, or else divided into panels, which were often filled, as at S. Maria Maggiore, with mosaic pictures. The portion of the wall at the end of the nave, over the triumphal arch, also offered a fine opportunity for mural decoration in mosaic, which was rarely, if ever, neglected. Mosaics also filled the apses and their semi-domes. Some of the most noticeable mosaics in Rome are in the Church of S. Pudenziana, in the octagonal tomb of S. Costanza, both of the fourth century, and in the Church of S. Prassede, of the ninth century. In the last, the white figures on a gold ground, relieved by a little red and black outlining, are amongst the most beautiful in the capital. Good mosaics also exist at S. Agnese, S. Maria Maggiore, and S. Sabina, but none of the Roman ones are comparable to those at Ravenna. At S. Sabina another method of decoration occurs, which has an extremely good effect. The spandrils of the arches are filled with small slabs of green marble and porphyry, arranged in patterns, and framed in by white marble. This work may be of the fifth century, when the church was built, or else may be due to restorations of a later period.

Ceilings.

The timber roofs are always of flat pitch, and of simple construction. They are now concealed by flat, deeply coffered ceilings, richly painted and gilded, most of which date from the fifteenth and sixteenth centuries, but there is every reason to believe that they were originally ceiled in a similar manner, and were never intended to be seen from the inside. This would be in accordance with the old Roman traditions.[1]

Floors.

The floors at first were of ordinary marble mosaic, such as

[1] In the provinces the roofs are generally open, without ceilings, and the timbers show.

was common in Rome in Imperial days; but about the twelfth century many were relaid with "Opus Alexandrinum," sometimes called "Cosmato" work, from a family of that name who were especially skilled in its execution. Opus Alexandrinum consists of large slabs surrounded by bands made up of small cubes of marble of different colours which form delicate patterns. These, in their turn, are framed in by broad bands of white marble. The contrast between the small patterns and big slabs is very striking, but the secret of the success of these floors is due in a great measure to the value of white as a frame work for colour—a recipe that does not apply to floors alone. This work was especially popular in Rome, because that city possessed large stores of marbles, mostly broken and chipped,

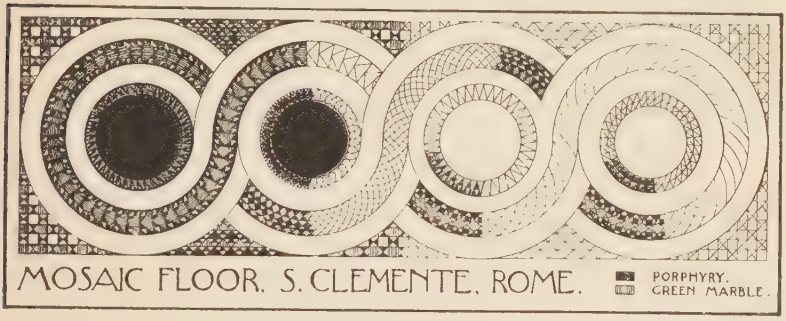


Fig. 116.

which could be sawn into slabs or shaped into minute cubes. Some of the slabs are of great size; in the Church of S. Maria in Cosmedin, one porphyry roundel is nearly 8 feet in diameter. The finest floors of this type in the capital are in the Churches of S. Maria Maggiore, S. Maria in Trastevere, S. Clemente, S. Maria in Cosmedin, and S. Lorenzo. Many of the fittings of churches, screens, pulpits, etc., are also inlaid with Opus Alexandrinum; the pulpit in S. Lorenzo being a remarkably fine example of the work.

Exteriors.

The exteriors of churches possessed little of the richness of the interiors, although the walls were either plastered and painted, or else covered with mosaics. Of architectural ornamentation, there was very little, but the aisle and clerestory walls of the Church of S. Apollinare in Classe, Ravenna, are arcaded, the arches springing from slightly projecting pilasters. This arcaded

treatment afterwards became universal, and the churches of the eleventh and twelfth centuries in all parts of Europe present

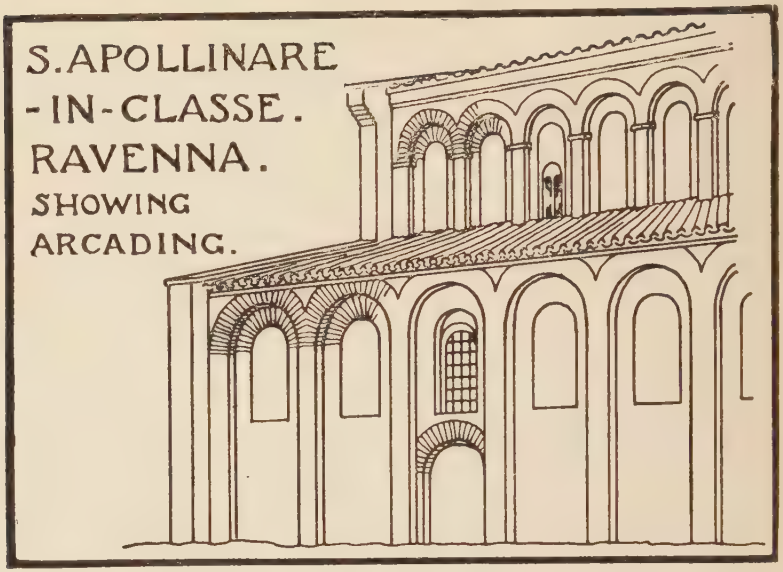


FIG. 117.

many effective varieties of it. Like most other features of Romanesque work, it owes its origin to ancient Rome.

Photo: Alinari.

FIG. 118.—S. MARIA IN TRASTEVERE, ROME.

Photo: Alinari.

FIG. 119.—S. PAOLO FUORI LE MURA, ROME.

[*To face p.* 184.

CHAPTER X.

BASILICAN CHURCHES, CIRCULAR AND MULTANGULAR CHURCHES, BAPTISTERIES AND TOMBS.

Churches in Rome.

Five-aisled basilicas.

Of the three large five-aisled basilicas built or founded by Constantine in Rome, the largest, S. Peter's, was pulled down when the present great cathedral was built on its site in the sixteenth century; S. Giovanni in Laterano has been so modernized and altered that very little indeed of the original remains, and still less shows; and S. Paul outside the walls was unfortunately almost entirely destroyed by fire in 1823. In these and in other basilican churches the chief object was to provide an inexpensive building which could be raised in the shortest possible space of time, and would accommodate the greatest possible number of people. The construction was very simple; and the decoration, being chiefly mosaics or paintings, could be added at any time when funds permitted.

S. Paolo fuori le Mura.

The present Church of S. Paul outside the walls, although modern, with the exception of portions at the chancel end, is, except in detail, so essentially a copy of the former one, that it may fairly be considered as an example of an early Christian basilican church. Its dimensions are truly noble: the nave is 78 feet wide and 280 feet long, and the total width is about 200 feet; the transept and apse together measure another 120 feet in length, so the church may be said to be 400 feet long by 200 feet wide. These dimensions are not exceeded in any mediæval cathedrals, except Seville and Milan, but it must in fairness be stated that S. Paul's, like other Roman basilicas, is very differently constructed from these. It has thin walls, incapable of doing more than carry its simple wooden roof; and its height, 100 feet, is comparatively small, and considerably less than many a French cathedral which has not more than half its width. Notwithstanding this, few churches convey such an impression of great size,

fine scale, and stately dignity. The nave has twenty-one bays of excellent proportion—a number far in excess of any Romanesque or mediæval cathedral. The columns are about 36 feet high, and their numerous carved capitals have a very fine effect, especially when seen in perspective from the west end, when they appear to form rich bands the whole length of the church. The triumphal arch is carried on lofty Ionic columns, as high as the cornices over the main arcades, which afford a pleasant contrast to the Corinthian columns of the nave. The intermediate aisles are higher than the outside ones by the height of the frieze of medallions above the arches, which corresponds with the similar frieze round the nave walls.

Three-aisled basilicas.

S. Maria Maggiore is the largest of the three-aisled basilicas. Its exterior has been so altered that from the outside there is little to show that the walls enclose a very fine example of an early basilican church. The nave, like S. Paul's, has twenty-one bays, which are spanned by lintels. The somewhat squat marble Ionic columns of the interior are antique, and formed part of the original fifth-century church, and some of the mosaics on the walls are also of this date.

San Lorenzo.

Sant' Agnese and San Lorenzo, both outside the walls, are the only churches in Rome that have galleries over the aisles. The Church of S. Lorenzo has a most interesting history. The original building was erected by Constantine, and like S. Agnese, consisted of nave, aisles, a returned aisle at the entrance end—in this case the east,—and an apse at the west. In the fifth century, Pope Sextus III., owing possibly to the change in orientation already mentioned, built another and a larger church with the entrance at the opposite end, the west, and the apse to the east; so that the two apses were back to back, as in the Temple of Venus and Rome. In this state the two churches remained, more or less separate from one another, with but minor alterations until the commencement of the thirteenth century, when Honorius III. destroyed the two apses, and threw the two churches into one, adding three more columns on each side. The later church then became the nave, and the earlier one the chancel. The floor of the latter was, however, very much below that of the nave, and Honorius therefore, in order to avoid descending to the altar, inserted a new floor over the old one, supported on piers, at a level about 3 feet above the nave floor, and utilized the space underneath as a crypt. The new floor of course cuts across the middle of the columns at

Photo: Alinari.

FIG. 120.—S. LORENZO FUORI LE MURA, ROME. [*To face p.* 186.

the sides which support the gallery, but notwithstanding this, the effect of the raised chancel, flanked and backed by the galleries with the crypt below, is extremely fine. The marble Ionic capitals of the narthex are particularly well carved, but what makes them of especial interest is that, as Cattaneo says, they are "indubitably the work of Honorius III. 1216–27."

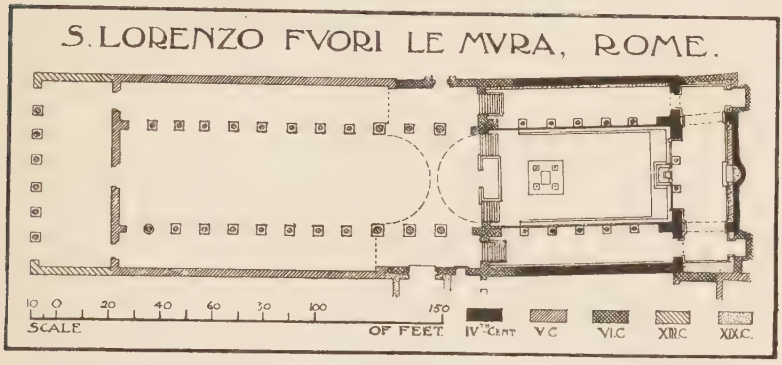


FIG. 121.
Cattaneo (Fisher Unwin).

This shows in a most remarkable degree how in Italy, in the thirteenth century, workmen could be found to execute classic detail, and to execute it well, at the very time that Amiens Cathedral was being built in France and Salisbury Cathedral in England.

San Clemente.

The Church of S. Clemente now consists of two buildings, one above the other. The lower is the original church, dating from between 514 and 523, which was partially destroyed some time before the twelfth century, when the present upper one was built. The plan of the original church is somewhat difficult to make out, but it is certain that it was considerably larger than that which took its place. Some of its old columns are built up in the piers which support the walls of the upper church. The rebuilding occurred about 1108, and the present church is therefore comparatively modern, but it presents so many of the characteristics of the old basilica externally, as well as internally, that it may almost be regarded as belonging to five or six centuries earlier. The most interesting feature of the interior is the low marble screen-wall, which projects into the nave in front of the high altar, and encloses the portion reserved for the

minor clergy and choir. Most of this screen belonged to the old church; and it is practically certain that it was reconstructed at the rebuilding in a position similar to that it occupied before, and may therefore be regarded as an example of the arrangement common in churches of the fifth and sixth centuries. From the two ambones, or raised pulpits, at the sides, the Gospel and Epistles were preached. The rest of the church internally has suffered like other Roman churches in cinquecento times, but the antique columns, some fluted, some plain, which separate the nave from the aisles, still remain. The church has no transept, and consequently no triumphal arch; but the apse and its surrounding wall are covered with mosaics. The exterior is perfectly plain, and except for the old cloistered atrium in front, which is one of the earliest in Italy, presents little of architectural interest, as almost all the old windows have been blocked up.

Cloisters.

Before leaving the churches of Rome, mention should be made of the fine cloisters which are attached to some of the most important, although they are all of later date than the churches themselves. The best are probably those of the Church of S. Paul outside the walls (1193–1241), which luckily were spared when the church was burnt. They are very fanciful in design and the unconstructional character of the shafts, most of which are either twisted or fluted, is pardonable because the weight to be carried is but slight. The shafts are arranged in pairs, and the twisted and fluted ones are enriched with marble and glass mosaics. Mosaics are also inserted in the frieze, the bright colours being fittingly framed by the white marble, of which material the whole of the work, except the plinth, is composed. Similar cloisters of the same period, attached to the Church of S. Giovanni in Laterano, have remained practically unaltered, notwithstanding the various changes to which that building has been subjected. Behind the piers which separate the arcading into bays are pairs of sturdy columns which carry the vaulting of the cloisters and form a contrast to the more delicate shafts in front. In the cloisters of S. Lorenzo single shafts with wide-spreading capitals support the arches, except in the centre where the shafts are coupled as in the other examples. This unusual arrangement is most successful.

Photo: Alinari.

FIG. 122.—S. CLEMENTE, ROME.

Photo: Alinari.

FIG. 123.—CLOISTERS, S. GIOVANNI IN LATERANO, ROME.

[*To face p.* 188.

Churches in Ravenna, Torcello, and Istria.

Introduction.

Ravenna, after Rome, contains the most interesting remains of early Christian work in Italy. These belong to three periods. The first extends from the beginning to the middle of the fifth century, and includes the buildings which are due to the Emperor Honorius and his sister Galla Placidia. The second extends from 493 to 539, when the town formed part of the kingdom of Theodoric; and the third, from 539 to 752, during which it belonged to the Eastern emperors, and was the seat of the exarch, or governor, who ruled their territories along the Adriatic.

There is not much difference architecturally between the three periods, as Eastern and Western methods of building occur in all. The workmen throughout were Greeks, whether under the Roman emperor, the Gothic king, or the Eastern governor. Owing to the conflicting influences, all the buildings in the town cannot be placed under one heading. The purely Byzantine ones will be considered later; but the others, which are of ordinary basilican construction, although Greek in detail, will be included now. Similar to these are the churches in Istria, the province that lies to the north and east of the Adriatic, which was subject to the Eastern emperors for exactly the same period as Ravenna.

Plan.

In plan these churches resemble those in Rome, except that the eastern transept, which forms so distinctive a feature in many of the latter, does not occur. One small peculiarity which denotes Byzantine influence is especially noticeable. In Roman buildings, antique and Christian, apses are nearly always semicircular externally as well as internally. In Byzantine churches they are commonly polygonal on the outside, the semicircular form being retained inside. The apses of S. Apollinare in Classe, Ravenna, the Cathedrals of Grado and Parenzo, and many other churches are thus planned.

Capitals.

The Ravenna churches possess one great advantage over the Roman, in that the capitals and bases of the columns were, as a rule, designed and worked for the positions they occupy. The columns themselves are sometimes antique, but very few of the details were pilfered from older buildings. The incongruities and bad proportions of the Roman churches are consequently avoided, and the interiors enriched by carvings as fine as the

chisel of the Greek workman could make them. In refinement of design and beauty of execution the capitals of Ravenna and Parenzo are not excelled even by those in Constantinople, and they are far superior to any of similar date in Rome.

S. Apollinare in Classe.

The two most important basilican churches in Ravenna are S. Apollinare Nuovo, in the centre of the town, and S. Apollinare in Classe, outside the gates. Both were commenced by Theodoric; the former was finished in 526, the latter not until 549, when the town had passed to the Eastern emperors. The more interesting is S. Apollinare in Classe, notwithstanding the splendid

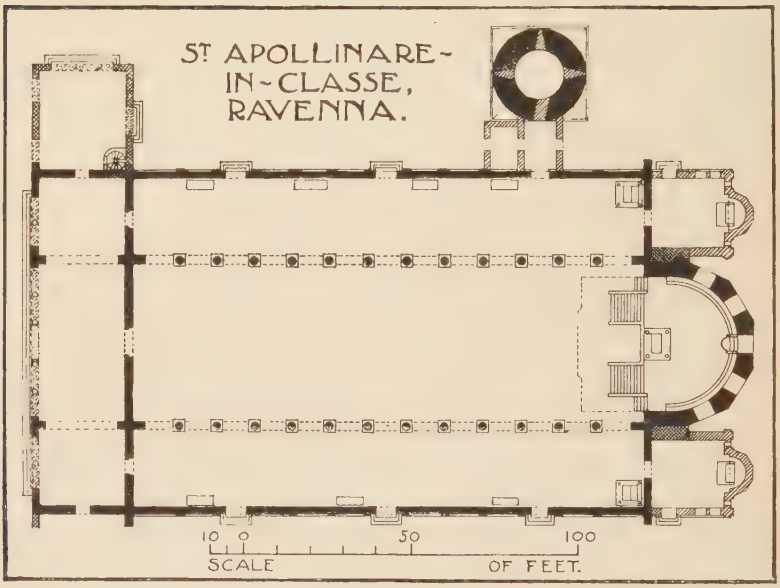


Fig. 124.

mosaics which decorate the other. The church is a large one, the nave being about 48 feet wide, and the total width rather more than double. The chancel is raised and approached by a flight of steps its entire width; and under it is the small crypt before mentioned. The carved capitals are in every instance surmounted by a dosseret, and are all alike. They are different from the usual Byzantine type, although similar ones exist in the Church of S. Sophia, Salonica, built about 495. In all the convex curve favoured by the Byzantines is retained, but the carving is bolder, and the outline more broken than is customary (see Fig. 107). The

church is built of thin bricks with mortar-joints as wide as the bricks, and although plain is extremely effective. The walls of the aisles and the upper walls of the nave are covered with arcading, each bay of which, except the westernmost, was originally pierced by a wide semicircular-headed window (see Fig. 117). On the north side of the church, but detached from it, is a circular tower.

S. Apollinare Nuovo.

S. Apollinare Nuovo has not the grace of the other church, and its proportions are not so striking. To the slightly earlier date of its erection—architectural progress was very rapid in the sixth century—are probably due the coarseness of the carving of the capitals, which are debased Roman in character, the classic character of the architrave round the arches, and the much-enriched cornice over. The soffits of the arches are coffered, with a flower in the centre of each panel in true Roman fashion. The attraction of the church is the mosaic frieze of figures which runs round the nave above the cornice. The severity of the figures and the simple colouring, chiefly white and gold, produce a very fine effect. The mosaics date principally from 570.

Torcello.

Two churches of great interest stand side by side in the little hamlet, Torcello, once a large town in the Venetian Lagunes.

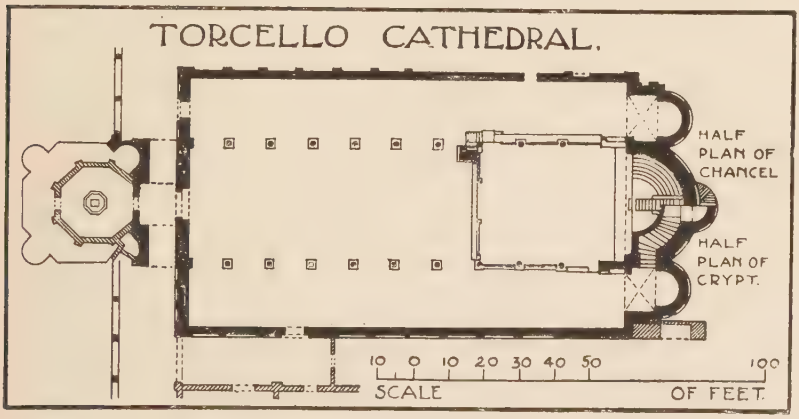


Fig. 125.

Cattaneo (Fisher Unwin).

One is basilican; the other, S. Fosca, is cruciform in plan and domed, and will be described when dealing with Byzantine work. The two are connected by a narthex which runs across the west front of the basilican church, and round S. Fosca,

The basilican church was begun in the seventh century, rebuilt in the ninth, and again in 1008. The central apse, which is the oldest part of the church, contains six rows of seats, of which the two top ones are concentric with the wall, the others being of slightly flatter curve. In the centre is the bishop's throne, approached by a straight flight of steps. Under the seats, a narrow staircase leads to a crypt smaller even than that of S. Apollinare in Classe. The main body of the church and the columns which separate the nave and aisles belong to the last rebuilding in 1008. The proportions are fine: the total width is about 70 feet, which is divided in the usual way—half to the nave and the other half to the two aisles. The capitals of the columns are the work of Byzantine carvers, who, at the end of the tenth century and beginning of the eleventh, were almost as skilled as their forefathers had been in the sixth. Like most others of the same period in Italy, they are free copies of Corinthian capitals, no two being exactly alike. Each has above the regulation curved-sided abacus another abacus of red marble, which is straight-sided, to afford better springing for the arch. This additional abacus is common in eleventh and twelfth century work in Italy, and in parts of France, notably in Burgundy. It takes the place of the earlier dosseret, and it did not entirely disappear until the Gothic style was fully developed. The remains of two baptisteries, one inside the other, the earlier being built in the seventh century, and the other at one of the later rebuildings, face the west door, immediately outside it.

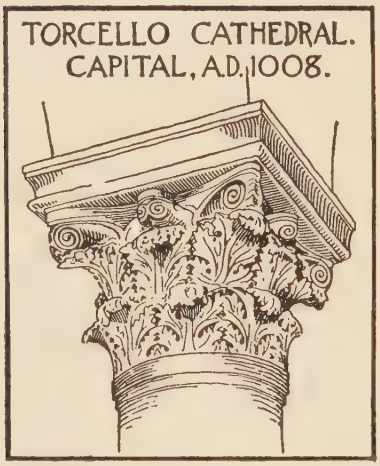


Fig. 126.

Parenzo Cathedral.

The most interesting churches in Istria are the Cathedrals of Parenzo and Grado, the former built between the years 535-543, and the latter about forty years later. Parenzo Cathedral still retains its old cloistered atrium, at the end of which is an octagonal baptistery, with a campanile of later date beyond. At the end of each aisle is an apse in the thickness of the wall—a favourite

arrangement in Eastern churches,—whilst the central apse projects, and is polygonal externally. Of this apse, Mr. Jackson says,[1] "In none of the basilicas of Rome, Ravenna, or Milan has the apse so well preserved its ancient magnificence." The lower part of the

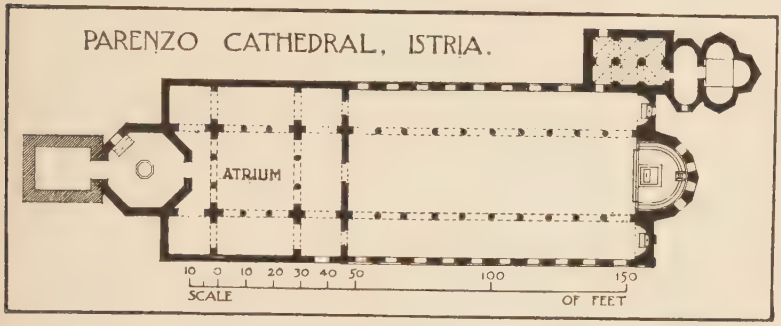


Fig. 127.

wall is lined with marbles, porphyries, mother-of-pearl, etc., with glass mosaics above and in the semi-dome. Round the apse is a semicircle of marble seats with a bishop's throne in the middle, as at Torcello.

Grado Cathedral.

The Cathedral of Grado resembles that of Parenzo in many respects, but differs from it in others. The baptistery is not at the west end, but to the north side of the church, alongside the chancel. The glory of the church is its early mosaic pavement of the sixth century, which extends over the greater part of the nave. It is very different in character from the "opus Alexandrinum" of the churches in Rome, and is composed entirely of small tesseræ of different colours, which form conventional and not geometrical designs, as in the other. Lettering is also introduced in inscriptions with excellent effect. The white bands of marble and the large slabs and roundels, which play so important a part in the Roman pavements, do not occur here.[2]

Summary.

The most noticeable peculiarity about basilican churches generally, when compared with later Romanesque and Gothic ones, is their spaciousness. This is due to differences in proportion. Internally, these churches have much greater width, combined with less height and length, than those of the other styles; and they also have their columns much closer together.

[1] "Dalmatia, the Quarnero, and Istria."

[2] A coloured drawing of it is given in Mr. Jackson's book, vol. iii. p. 422.

Few Gothic churches (excepting cathedrals) have, like S. Apollinare in Classe, a nave nearly 50 feet wide—York Cathedral is the only one in England of this width—and not even Milan Cathedral is as wide as the Church of S. Paul outside the walls. The close spacing of the columns between nave and aisles necessitates many bays, and this multiplication of bays is most useful in giving scale. No Gothic nave has anything approaching the number of bays, twenty to twenty-four, found in the large Roman basilicas. Each bay of the arcade in the Ravenna church is 12 feet, centre to centre; at Torcello it is 11 feet; in Parenzo Cathedral 10 feet; and even in the great Church of S. Paul at Rome it measures only 13 feet 4 inches. In England the piers in Gothic churches are closer together than they are abroad, but even here about 20 feet, centre to centre, is the average for cathedrals, and about 15 feet for large churches. In France and Germany the intercolumniation is greater, and in Italy it is sometimes as much as 60 feet, as in the Cathedrals at Bologna and Florence. The chief drawback to the adoption of the basilican plan for large modern churches is that the appearance internally would be too plain unless the columns were of marble, which would be expensive, and the walls decorated with paintings or mosaics. If we had a school of painters trained to do this work, and willing to execute it at prices which would not be prohibitive —decorative work cannot be paid for at the same rate as easel pictures—it is quite possible that the basilican plan would be the best to adopt for large churches in crowded neighbourhoods. It is in many ways suited to our requirements; the simple cylindrical column always produces a satisfactory effect, and it is doubtful if all the ingenuity displayed by the Gothic architects in their clustered piers ever succeeded in producing a combination which equals in dignity the simpler column. It may be urged that many columns are somewhat of a drawback, but, as a matter of fact, they do not really offer the same obstruction as half the number of piers, twice the size, such as are customary in Gothic churches. A church without internal columns or piers is, no doubt, in many respects the best suited to modern ritual; but it is difficult to obtain a satisfactory effect, either externally or internally, in a church of a single span, and the expense is little less than in one divided into nave and aisles, as the entire area has to be of the full height.

Coptic Churches in Egypt.

Many of the churches in Egypt are earlier in date than those already described, and it is more than probable that they suggested many of the modifications in plan found in Italian churches. Their general ordinance is partly Italian, partly Byzantine. In plan they are basilican almost without exception. The columns of the internal arcades are generally returned at the west end, as at S. Agnese, Rome; and eastern transepts, which, like those in Italy, do not project beyond the aisles, are customary. At the east end are always three altars, which are placed either in apses or in square recesses concealed in the thickness of the wall. The central and most important one is called the "haikal." This triapsal arrangement was evidently customary in Egypt long before it appeared in Italy. The seats for the clergy are generally arranged round the "haikal," like those at Torcello and Parenzo, and behind the bishop's seat in the centre is a little niche in the wall for an ever-burning lamp. The east end is separated from the body of the church by a hinged screen of wood, sometimes inlaid with marbles and ivory and often covered with paintings, which answers to the iconostasis of the Greek church.[1] Over the side and end aisles are galleries for the women. Most of the openings in the gallery fronts are now walled up, but originally they were filled with pierced screens, which allowed the worshippers behind them to follow the services, but effectually shielded them from the view of the men below. Plan.

Most of these churches depart somewhat from the rules laid down in the last chapter regarding what constitutes a basilican church, inasmuch as, following the traditional custom of the country, they are either vaulted with barrel vaults or are domed. The barrel vaults, except in the earliest examples, are *pointed*. Many of the arches between the columns are also pointed, showing that this form was employed by the Copts in their churches long before it appeared in the West. Over the east end are generally three domes, side by side, and other portions of some churches are also domed. This use of the dome does not necessarily indicate Byzantine influence. The dome had for centuries been an appendage of the East, and the early Copt builders were well acquainted with its construction, and probably used it long before Construction.

[1] See p. 223.

Constantine went to Byzantium, certainly long before Justinian built S. Sophia.

Exteriors.

The exteriors of the churches are generally very bare and plain. Those built up the Nile and in the desert differ very little in appearance from the ancient temples, as nothing shows from the outside except plain walls, crowned by the eternal "gorge," or some moulding resembling it, with perhaps a dome or two rising up behind. Some of the churches are built inside old temples, as at Dendereh. When the earlier churches were built in Cairo, some architectural expression was doubtless given to them externally, but after the Saracen invasion the desire of the Christians, as Dr. Butler states in his "Coptic Churches in Egypt," was to avoid attracting the attention of the Mohammedans as much as possible, and they therefore surrounded their churches by other buildings to such an extent that Coptic churches in cities may almost be said to have no exteriors at all.

Interior decoration.

The interiors were decorated in much the same manner as those of the churches in Italy, and many of these decorations still remain. The walls are veneered with marble, or else covered with marble mosaic—not glass mosaic—the designs of which are often very complicated. Sometimes the walls, columns, and fittings are painted, but these paintings are generally of later date than the churches.

Cairene churches.

The most remarkable of the Cairene churches form a group in Old Cairo. The Church of Abu Sargah, or S. Sergius, built in the eighth century, is the most typical of these, although no two are alike. It is a fairly large church, with the nave arcades returned at the west end to form a narthex, at the north end of which is an apse, a somewhat unusual arrangement. Under the floor of the narthex, on the central axis of the nave, is a tank known as an "Epiphany tank," such as is frequently met with in other churches in Egypt. Over the narthex and aisles runs a gallery, and under the central part of the east end is a crypt. (Fig. 128.)

Desert churches.

The monastic Church of Dair-as-Sûriâni, in the desert, was founded by Greeks from Syria in the sixth century, who, there is every reason to believe, built the church which now exists. It is interesting for many reasons. The arches of the arcade are pointed, and so is the barrel vault which covers the nave. Over the centre of the transept is a dome supported on the north and south sides by transverse arches, beyond which are

semi-domes.[1] The sanctuary is screened off by folding-doors, which Dr. Butler states to be of the eighth century, and the

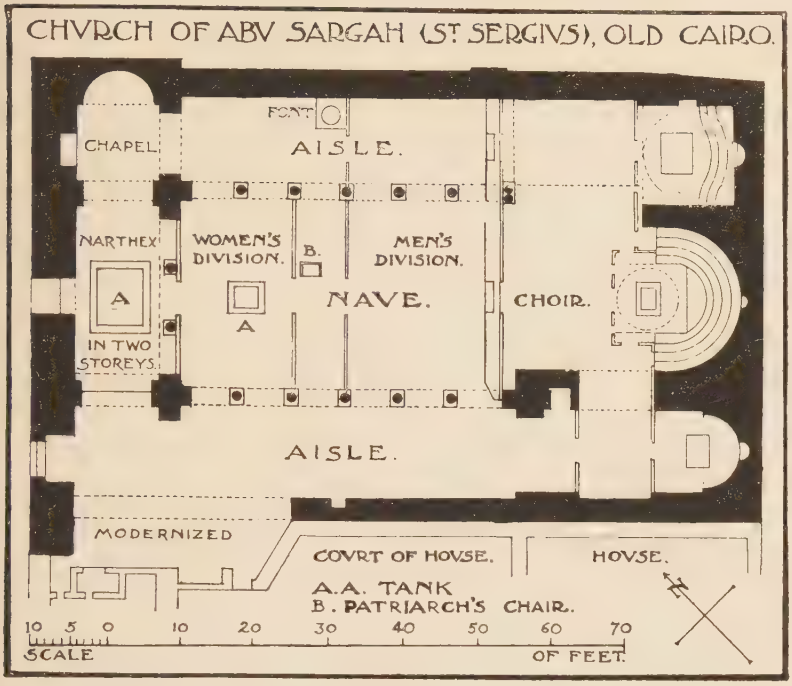


FIG. 128.
Butler (The Clarendon Press).

oldest of their type in Egypt. In the Church of Dair - Baramous, which is larger, the pointed arch is also used throughout for the nave arches and vaults, the latter being strengthened by transverse ribs thrown across from pier to pier. The principal dome over the haikal is carried on stalactitic pendentives such as were afterwards

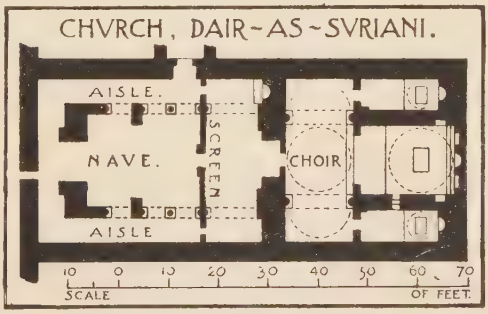


FIG. 129.
Butler (The Clarendon Press).

[1] The arrangement is not unlike that in S. Sophia, Constantinople, which was built in the same century, except that here the semi-domes are north and south, instead of east and west. (See Fig. 155.)

common in Mohammedan work. Mons. A. Gayet, in his "L'Art Copte," states that it was from the Coptic churches that the Saracens took the idea of the pointed arch and the stalactitic vault, or rather that, as they compelled the Coptic workmen to build for them, these men naturally followed, in the mosques, the methods they had been accustomed to employ in their churches.

Upper Egypt.

The two most important Coptic churches in Upper Egypt are known as The White and The Red Convents. The White Convent is said to have been built about 310, and if this date is correct it is one of the oldest of Christian churches. The chief peculiarity about the church is that east of the transept is a choir with three apses, which are placed north, south, and east respectively.

Churches in Constantinople and the East.

Constantinople.

It might have been expected that the earliest examples of Christian architecture would be found in the capital which was built by and named after the first Christian emperor; such, however, is not the case. Practically nothing remains at Constantinople of buildings erected by Constantine, or by his immediate successors, which have any connection with Christianity. The oldest existing church in that city was not built until 463, on the site of an older building. It is dedicated to S. John the Baptist, and is a three-aisled basilica similar to many in Rome, except that it is nearly square. Over the aisles are the galleries customary in the East. The narthex is the oldest part of the church, and the columns, which have elaborate capitals, support the original entablature.

Bethlehem and Jerusalem.

Little or nothing is standing of the basilican church built by Constantine to enclose the Holy Sepulchre at Jerusalem, although the existing circular portion at the west end is probably partially built on the foundations of the apse of the original church. If this is so, it follows that the nave must have been to the east, in which case the orientation of so many of the early churches is accounted for. At Bethlehem, the Church of S. Mary, or the Nativity, attributed by some to Constantine's mother, Helena, preserves much of its original character. The nave has double aisles, and the openings between the columns are spanned by lintels.

Salonica.

Salonica is far richer than Constantinople in early churches.

Most of these are basilicas, although two or three are of Byzantine plan. As at Ravenna, most of the capitals are finely carved, and are of the same date as the churches. Two of the earliest of the basilican type are S. Demetrius and another, now a mosque, which is known as Eski Djuma. Texier and Pullan state in their "Byzantine Architecture" that these were built at the end of the fifth century, or the commencement of the sixth. This shows that at that time the old Roman traditions were still strong in the east, and had not yet been superseded by Byzantine methods of construction; although if the Church of S. Sophia, in the same town, was really

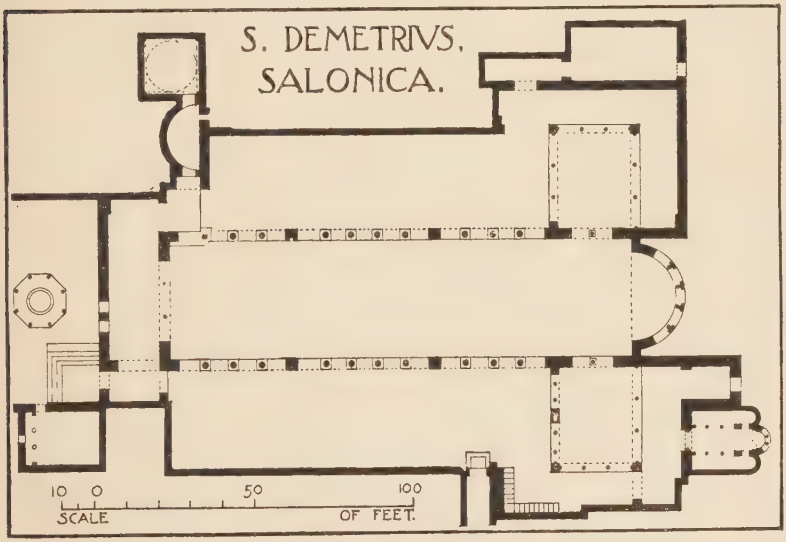


FIG. 130.
Texier & Pullan.

built in 495, as some authorities contend (see Fig. 159), it is clear that, as at Ravenna, men were divided as to the most suitable plan to adopt. S. Demetrius has double aisles, the mosque only single ones. In both the columns return at the west end, and form the western aisle, or inner narthex. Each church has a large semicircular apse, which follows the Roman plan of being semicircular externally as well as internally. S. Demetrius has transepts at the east end, but there is no triumphal arch, and the nave arcades are continued the entire length of the church, cutting off the transepts from each other. Over the aisles are galleries for the women, which stop against the transepts as these

are carried up the full height of the nave. The nave arcades are separated into divisions of four or five bays each by piers, as in the Churches of S. Clemente and S. Maria in Cosmedin, Rome. S. Demetrius is some two centuries earlier than they, and so the probability is that this arrangement originated in the East, whence it was transplanted to the West.

Churches in Syria.

The churches in Syria are amongst the most interesting of the early Christian examples. A few are square or octagonal, like the Byzantine churches, but the majority are oblong in plan. They are not of great size, but their detail is marked by great beauty and refinement, and their planning is often characterized by considerable originality. Their carving is more reminiscent of ancient Greek art than of contemporary Byzantine work, and is such as might have been expected from descendants of the men who built the temples of Asia Minor centuries before. Most of the churches were built in the fifth and sixth centuries; a few may be as early as the fourth; but none are later than the Saracenic invasion in 639. The latest date which has been found carved on any church is 565.

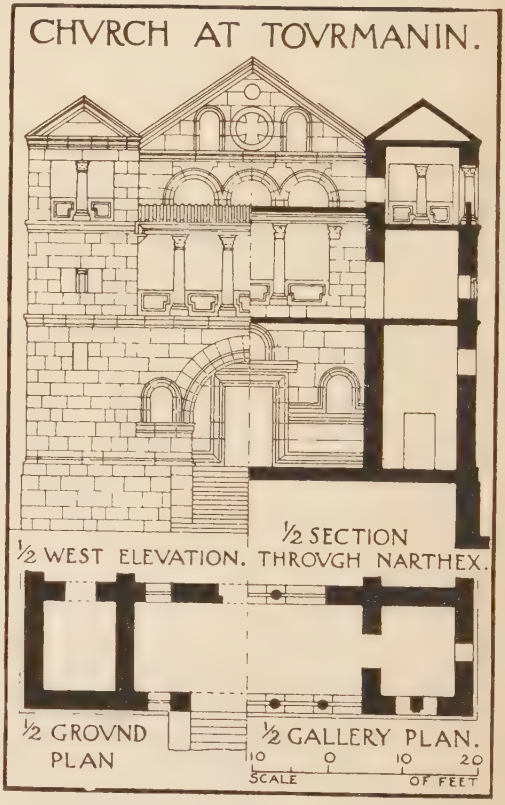


FIG. 131.
De Vogüé (Beranger).

Materials and construction.

All the buildings, whether ecclesiastical or secular, are of stone, to which circumstance their preservation is owing, and very large blocks, as a rule, were employed. Many of the doorways and windows have lintels, others are arched.

Sometimes, although the top is semicircular, the construction is really lintel, as the head is cut out of a single stone, as at

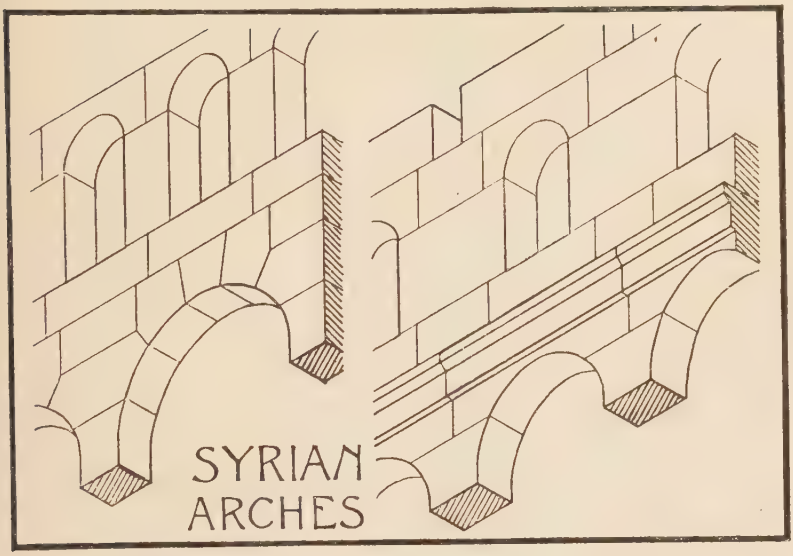


Fig. 132.

Moudjeila. In many of the churches, also, the arches of the internal arcades can hardly be said to be of true arch construction, as most of the stones have horizontal beds, and only a few of the upper ones are voussoirs.

Exteriors.

These show considerably more design, as a rule, than existed in Western churches; partly, no doubt, owing to the material of which they are built. At the west end is always a narthex, over which is often an open gallery with columns in front. In the wall behind are windows, one or more, as the case may be. This recessing of the western windows has an excellent effect, and was adopted later in some of the Romanesque churches in Italy of which S. Ambrogio, Milan, is the most famous. The narthex is often flanked by low towers, crowned by pediments of flat pitch, as at Tourmanin (Fig. 131), which come at the end of the aisles. The principal doorway is always at the west end, but one peculiarity about these churches is the number of side entrances in addition. The east end sometimes has three apses, as at Kalat Seman, but a single apse at the end of the nave is more common, and is generally enclosed within the

thickness of the wall. Some apses are semicircular inside and out, others are polygonal externally, and one, at Tourmanin, is polygonal on both sides. The projecting apses at Kalat Seman and Qalb Louzeh are decorated with two tiers of attached columns, which start from the plinth and finish under the over-sailing course at the top of the wall. This method of decorating walls, which was doubtless suggested by the columned and arcaded buildings of ancient Rome, also found favour with the later Romanesque builders in all countries. It is not suggested that the latter copied these Syrian churches—the country being in the hands of the Saracens, the churches must have been a dead letter to the Western world when the others were being built—but it is interesting, and not a little curious, to note, although some centuries and many hundreds of miles intervened, the similarity which exists between the work in the different countries. The builders, both Eastern and Western, drew their inspiration from the same source, and employed it in much the same manner. Where the Syrian work differs chiefly from the other is in its greater refinement and purer classic spirit. For this its proximity to ancient Greek examples and the Greek blood in its makers are responsible.

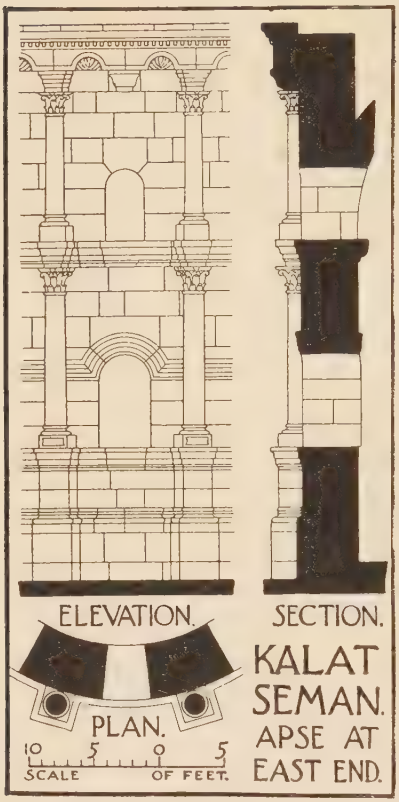


FIG. 133.
De Vogüé (Beranger).

Plans.

The most interesting of the churches are those in which piers, and not columns, are used for the nave arcades, the bays being very few in number and of considerable span. Such are the Churches at Roueiha and Qalb Louzeh, both of the sixth century. These two churches show an originality surprising indeed at this

early period. They are basilicas in a sense, since they are divided into nave and aisles, and possess other characteristics of the basilican plan, but in the spacing and number of their supports

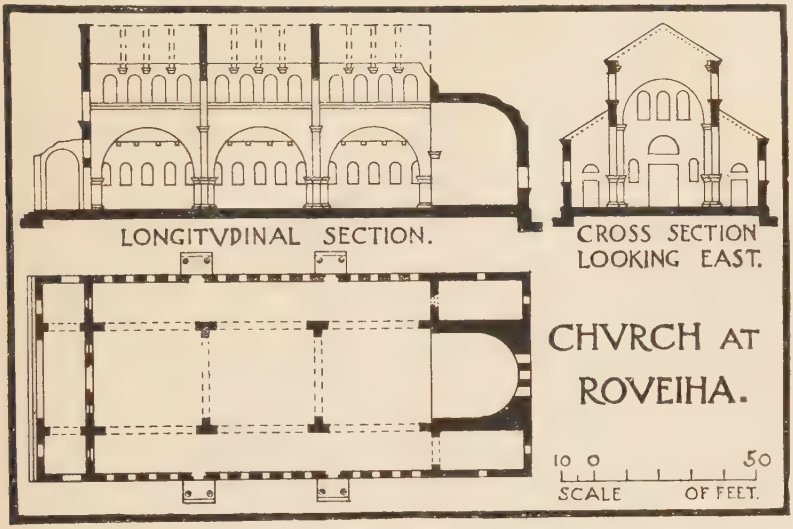


Fig. 134.
De Vogüé (Beranger).

they differ from most churches and resemble more the basilica of Constantine than that of Trajan (see Figs. 78, 80).

Roueiha.

In the Church at Roueiha the arcade consists of three arches on each side, which spring from stumpy piers, about 10 feet high, which are T-shape in plan. These piers are about 33 feet apart, from centre to centre, and from them transverse arches are thrown across the nave, the width of which is rather less than the distance from centre to centre of the supports. The windows are almost continuous in the aisles, and there are four to each bay of the clerestory. Besides these, there is little to give the church scale, and yet the effect of the long nave divided into three almost square bays by the transverse arches must have produced an extremely dignified effect. The piers of the Church at Qalb Louzeh are oblong, and consequently no transverse arches span the nave. In this respect the church is inferior to that at Roueiha, but, on the other hand, an excellent effect is produced by detached shafts between the clerestory windows, which rest on corbels and support the beams of the roof. The internal

details are excellent throughout, especially those which enrich the arch at the entrance to the apse. Altogether, much may be learned from a study of these two churches, and of others in Syria, which should be of use to modern architects. Their plans are eminently practical, would adapt themselves to our ritual, and be inexpensive to build.

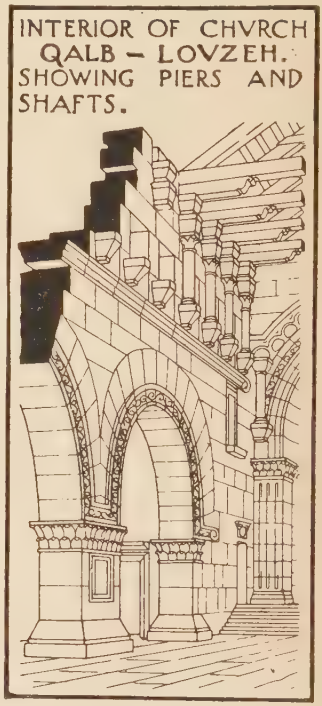


FIG. 135.
De Vogüé (Beranger).

Kalat Seman.

Of the churches in which columns are used and not piers, the great one of the Convent of St. Simeon Stylites at Kalat Seman is the most remarkable. It is not only one of the most interesting of ancient churches, but it is also one of the largest. It was completed in 459, and consists of four basilicas, grouped together in the form of a cross round a central octagon, about 92 feet in diameter, which is not roofed over. The total length of the church from east to west is about 330 feet, and from south to north 300 feet. The arms are connected by aisles on the canted sides of the central octagon, and opening out of each is a small apse, lighted by windows, which may have been used as a chapel. The planning of this central part is very ingenious, and the perspective effects from all sides must have been very striking.

Stone vaults.

All the above churches had timber roofs, but many of the secular buildings, and some of the churches in the southern part of Syria, in what is known as the Haouran, are vaulted with stone. In the secular basilica of Chaqqa, which is of the third or fourth century, the vault is similar to that over the Baths of Diana, at Nîmes (see Fig. 75). Transverse semicircular arches, about 12 feet apart, are thrown across the central portion of the building, and on the extrados of these rest long stones which reach from one arch to another and form a barrel vault the whole length. In the Church at Tafkha, instead of a barrel vault, a flat ceiling is carried in the same manner. Everything in the

Haouran is of stone, even to the doors; the reason being that it was easily obtainable, whereas wood was exceedingly scarce.

The remains of domestic work are of great extent and considerable interest, but space does not allow of a full description of them. All over Syria they are to be found, in much the same condition as when they were abandoned on the arrival of Domestic work.

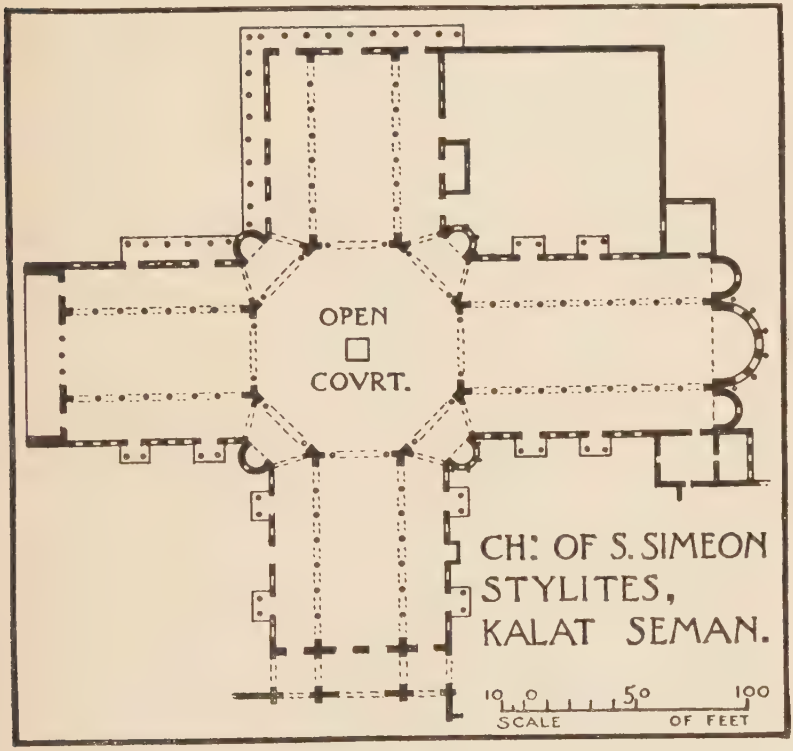


FIG. 136.
De Vogüé (Beranger).

the Saracens, except that they are now roofless. The general plan is much the same in each. A portico extends along the front of the house, and shelters the rooms behind from the sun's rays. The back rooms are entered from the front ones by arches, and the upper storey, which is almost universal, is approached by an outside staircase.

Circular and Octagonal Buildings.

The early Christian circular and multangular buildings in Italy, all of which follow closely Roman models, although not so valuable architecturally as those of similar forms built by the Byzantines, are interesting as connecting-links between Roman work and the fully developed domical style of the East. A few were built after the Byzantine work had reached perfection, but the others are anterior. They are of two classes; those which are constructed in the same manner as the basilican churches form one class; and those which are founded on the tombs and other domed buildings of the Romans compose the other. The former have thin walls, timber roofs, and columns to divide the different parts from one another; in the latter, the walls are thick, the interiors domed, and in many cases there are no columns or piers inside at all. The dome does not always show externally, as it is sometimes covered by a timber roof. Only a few of the buildings were originally intended to be churches—it is sometimes disputed if any were; the others were either baptisteries or tombs.

Baptisteries and tombs.

In the early days of Christianity, when baptism was by immersion, and was only performed at the three great festivals of the year, baptisteries had to be of considerable size. The circular or the multangular form, with a font in the centre, was naturally found to be a better shape than the oblong, which was common for churches. The ceremony was performed by the bishop, which accounts for baptisteries always being attached to cathedrals and not to parish churches. Tombs also naturally followed the circular and octagonal plans; partly because a big central space was the most suitable for gatherings of the deceased's relatives and friends, and partly because the old Pagan tombs were of these shapes. An exception is the little mausoleum of Galla Placidia, at Ravenna, of the fifth century, which is cruciform. This contains three sarcophagi, which are placed in the three end arms of the cross.

Churches with timber roofs.

By far the most remarkable of circular churches with timber roofs is that known as S. Stefano Rotondo, in Rome, built, according to Cattaneo, in 468–482. Two concentric ranges of columns divide the church into a central portion and inner and outer aisles. At present much of the outer aisle is destroyed, and a wall is built

between the columns of the outer range, except at one end. The central portion is now divided by lofty columns, which add greatly to the effect, although they are not part of the original design. On the wall over them rest the tie-beams of the flat ceiling, and some authorities contend that before the columns were placed there the central part was open to the sky. The inner colonnade consists of twenty-two columns, two of which were enclosed by piers when the central space was divided. The columns have

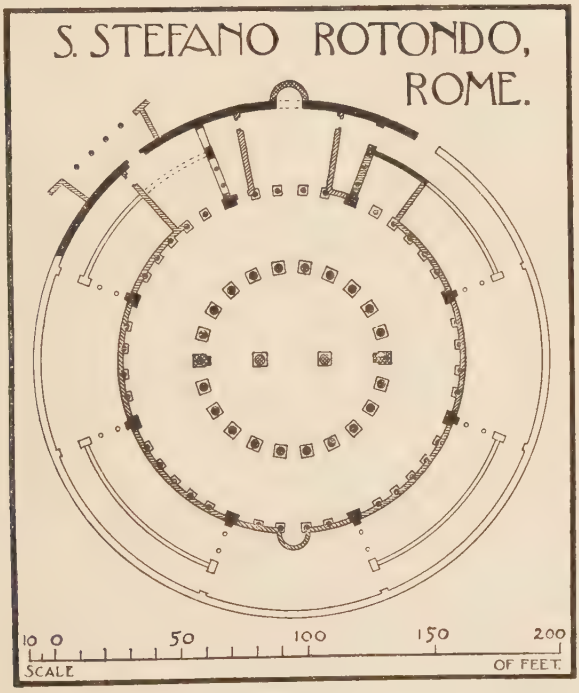


Fig. 137.

roughly carved Ionic capitals, and carry stone lintels. The outer colonnade is arched, and is divided by piers, as at Salonica, S. Maria in Cosmedin, etc., into divisions of either five or six bays each. There is a reason for the piers in this instance, which does not exist in the rectangular churches; viz. that the columns composing the divisions of five bays are higher than those of the six-bays divisions. The former have Corinthian capitals, the latter Ionic, and all have the dosseret over. The floor is level throughout, and there are no signs now of the central part having

been sunk, which would have been the case if the building had been a baptistery. At Perugia is a church similar in plan and design, but it was not built until some centuries later.

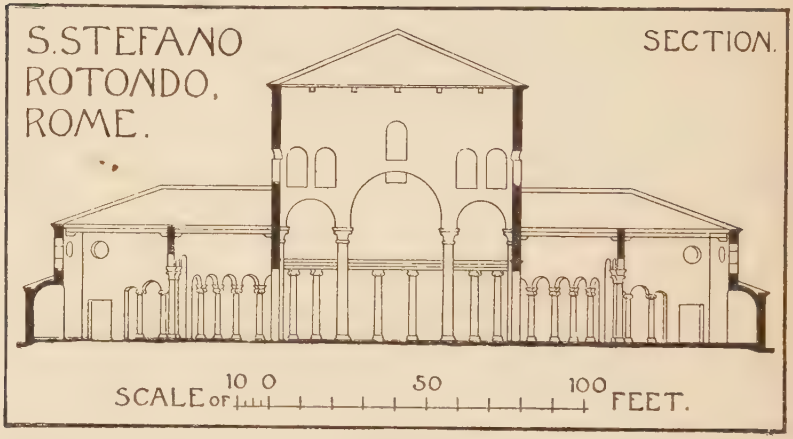


FIG. 138.

Baptistery of Constantine.

The Baptistery of Constantine, attached to the great Church of S. Giovanni in Laterano in Rome, is an octagonal building, divided into central portion and surrounding aisle by eight massive porphyry columns, crowned by capitals of different orders, over which are smaller columns. The central part is domed with an octagonal dome of timber construction, and the aisle is covered by a flat ceiling level with the springing of the dome; but these have been so altered at different times that it is difficult to say what was the original design. It is manifest, however, that the upper columns are too slight to carry any heavier construction than that now employed, and the thinness of the outer walls also proves that one dome to cover the whole building was never contemplated.

Domed circular buildings.

The most interesting of domed circular buildings in Rome, with internal columns, is undoubtedly the Tomb of Costanza, daughter of Constantine. Of those which have no internal columns, the Church of S. George, at Salonica, is the most characteristic, although some doubts exist as to when it was built.

Tomb of Costanza.

The Tomb of Costanza is outside the walls, close to the Church of S. Agnese. The internal columns of granite, twenty-four in number, are grouped in pairs in order to be of sufficient

strength to carry the central dome, and to resist the thrust of the barrel vault which covers the surrounding aisle. The building is very Roman in all its characteristics, which is only natural considering that it dates from the fourth century. Above each coupled pair of columns is an entablature, from the top of which spring the arches. The barrel vault over the aisle is similar to those which cover the galleries in the great theatres and amphitheatres, and is enriched with fine mosaics contemporary with the building itself. At Nocera, between Naples and Paestum, is a building, now a baptistery, of somewhat similar plan, with coupled columns, central dome, and vaulted aisles, but it is much later in date.

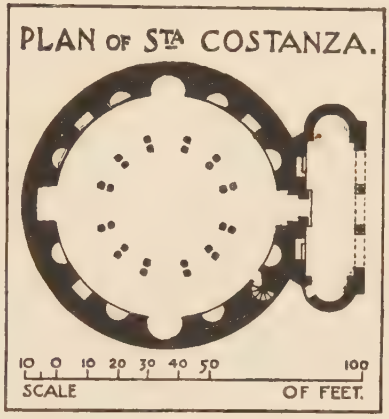


FIG. 139.

S. George, Salonica.

S. George, Salonica, is an interesting example of the type of church consisting of a circular nave and oblong apsidal-ended

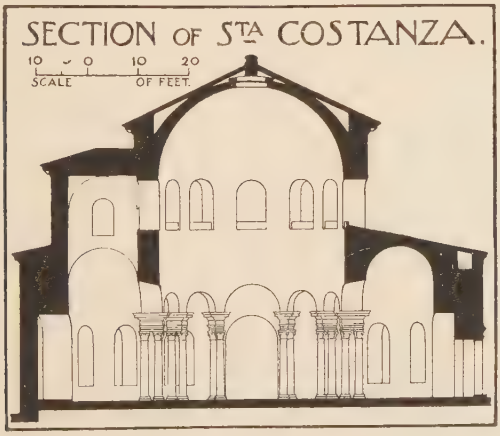


FIG. 140.

bema, or chancel, which afterwards became a favourite in Germany, Italy, and other countries. Whether the two parts of the building were built simultaneously is uncertain; probably the circular

portion is Roman, and the bema, which has much thinner walls, a Christian addition. The former is 80 feet in diameter, and is surrounded by a wall 18 feet thick, the lower part of which encloses eight big niches like those of the Pantheon, except that all are rectangular in plan. Two form entrances to the church, and a third is cut through to afford access to the chancel. Over the dome is a flat pitched roof, and the outside wall, considerably thinned, is carried up above the springing of the dome to support the tie-beams and rafters. This arrangement, whatever the date of the building may be, whether Roman or early Christian, must be regarded as an early example of the custom, afterwards common in mediæval churches, of covering a vault or dome by a protecting timber roof, the vault itself being quite thin, and very different from the thick concrete vaults of the Romans. The wall being carried up, its weight exercises a vertical pressure, and counteracts any lateral thrust the dome may have. The church is lighted by lunettes in the dome just above the springing, and by wide semicircular-headed lights below.

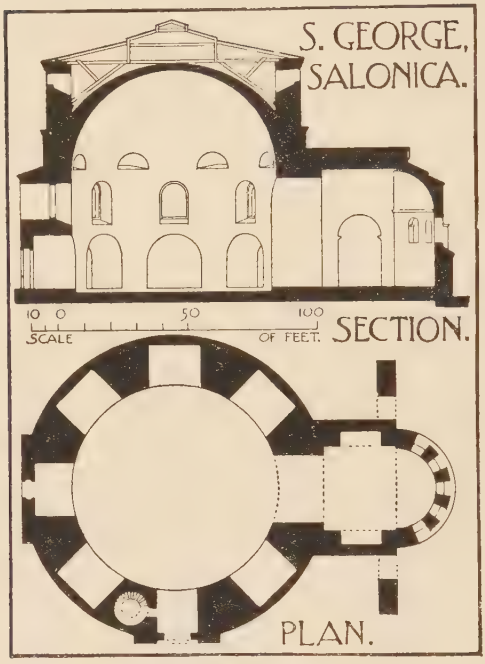


Fig. 141.
Texier & Pullan.

Tomb of Theodoric.

The Tomb of Theodoric is a good example with which to finish this account of early Christian work, because it is one of the most refined and original buildings in existence, and was undoubtedly the work of Byzantine Greeks, since no other artificers at the beginning of the sixth century could have produced a work of such character. It is two storeys high, and decagonal in plan. The wall of the lower storey is arcaded, and is much thicker than

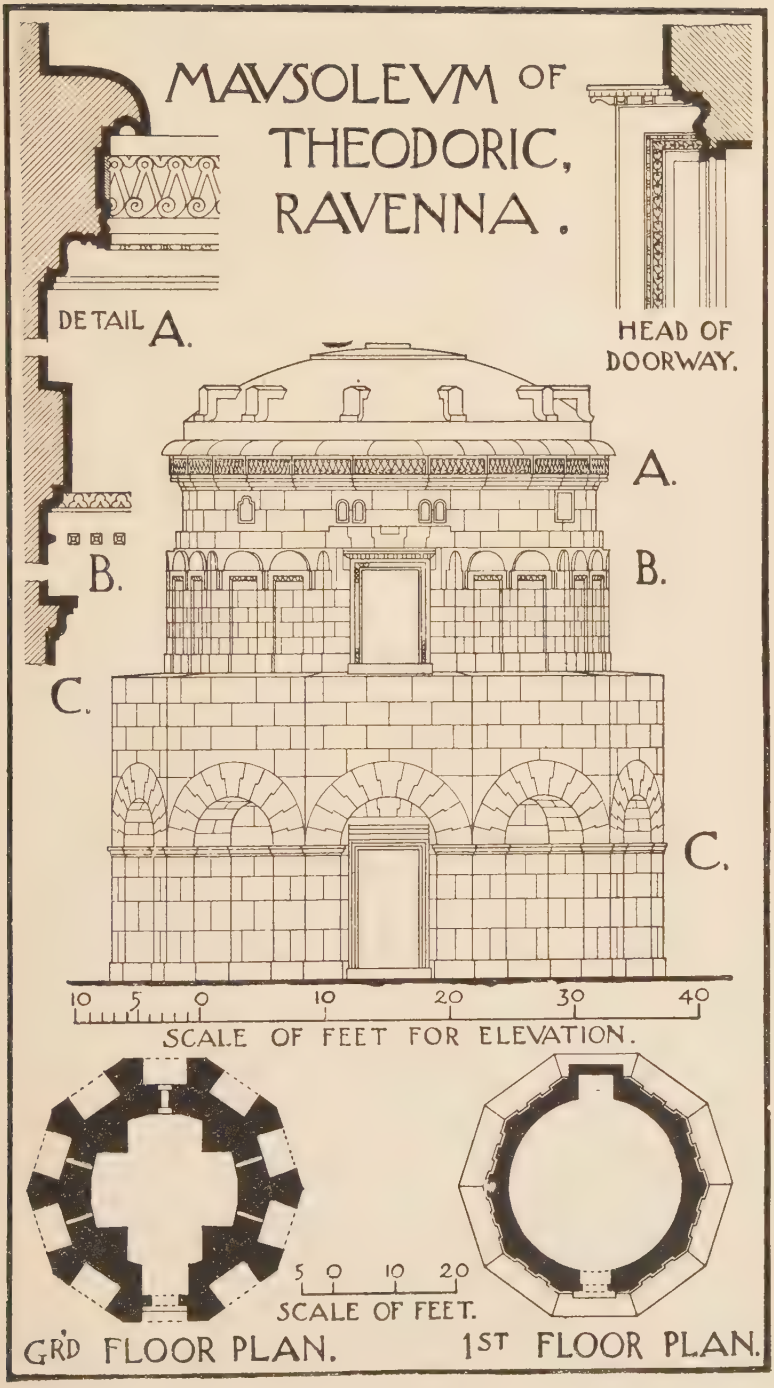

MAVSOLEVM OF
THEODORIC,
RAVENNA.
DETAIL A.
HEAD OF
DOORWAY.
A.
B.
C.
A.
B.
C.
10 5 0 10 20 30 40
SCALE OF FEET FOR ELEVATION.
5 0 10 20
SCALE OF FEET.
GRD FLOOR PLAN.
1ST FLOOR PLAN.

Fig. 142.

that above, which is set back so as to form a terrace all round at the first-floor level. The upper part, which is circular internally, is 30 feet in diameter, and is covered by one immense block of Istrian stone, which forms a flat dome. The handles on the outside were used for raising it. Some arcading which surrounded the upper wall and rested on the projecting lower storey no longer exists, but it is doubtful if the building would have looked so well with it as it now does without it.

CHAPTER XI.

BYZANTINE ARCHITECTURE.

At Constantinople, the East joins hands with the West, and here it was that Byzantine architecture, the first of the great Christian styles, had its rise and reached its zenith. From the East, it inherited a love for colour, a delight in rich materials for internal decoration which contributed greatly towards its success, and its crowning feature, the dome; and from the West, fine scale and bold construction. For its development it was largely dependent on Greek artificers, who, for the first time for centuries, were released from the restrictive limitations which had hampered their work in the days of the old Roman Empire. They were on their native soil once more; and the old Greek artistic instinct awoke to new life in the greater freedom of a new city, a new religion, and, to some extent, a new construction.

Byzantine art is divided into two periods, each of which possesses distinct characteristics. The two are separated from one another by a considerable gap, during which time few churches were built. The first, and greater period, is that of the sixth century, when, under Justinian, 527–65, a powerful movement, which culminated in S. Sophia, Constantinople, lifted architecture on to a high pedestal, and produced a renaissance which influenced all work for many centuries, not only in the East, but also in Italy and other countries in the West. At the beginning of the seventh century, the struggles of the Empire with the Persians, and later with the Saracens, almost stopped all building; and in the following centuries the fury of the iconoclasts against images and decoration generally, drove many of the best workmen out of the country, and still further impeded architectural progress. Under the dominion of the house of Macedonia, 867–1057, a revival commenced which is especially marked in Venetian territory, where S. Mark's stands as the rival of S. Sophia; but it was not until some years later, under the Comneni, who were emperors

Periods.

of the Eastern Empire from 1057–1185, that this bore fruit. Most of the existing churches in the capital, in Greece, Armenia, and in other parts of the Empire belong to the second period.

Pendentives.

The greatest achievement of the Byzantines was carrying a dome over a square by means of pendentives. They cannot claim to have invented this method, as there are many buildings in the East of earlier date in which it was adopted, but these

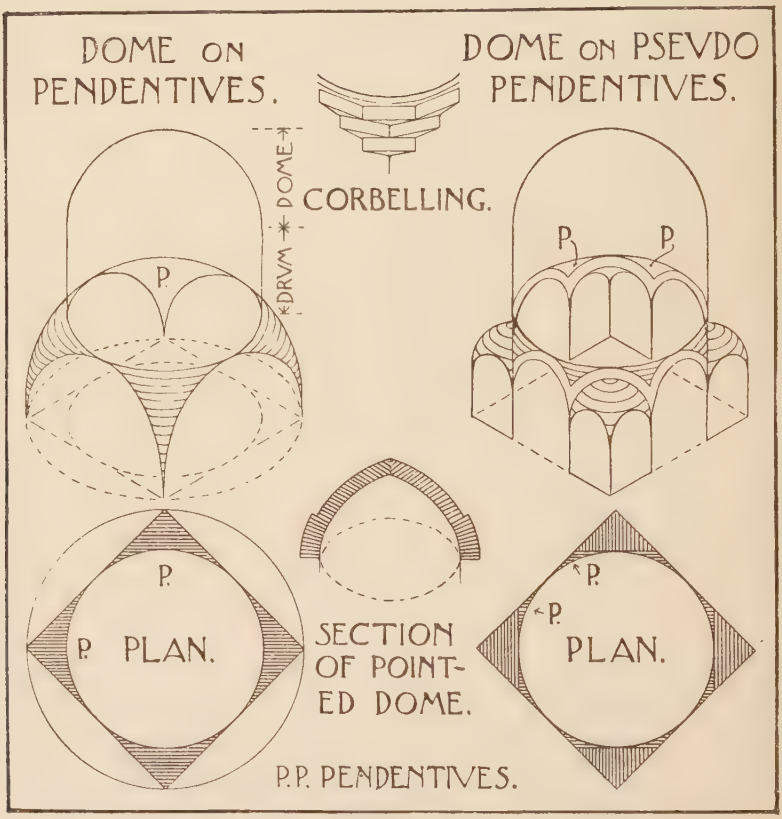


Fig. 143.

are all small. One example, at Kusr-en-Nûreijîs, in Palestine, is of the second century A.D., and others may be as old. But although the Byzantine architects did not invent the pendentive-carried dome, to them must be given the credit of being the first to employ its principles on a large scale. This is a greater honour than the words might imply; as the difficulties of carrying a

small dome are but slight, whereas to construct one of the size of that of S. Sophia, and to raise it on piers and arches, so that it shall stand high above the other parts of the building, demands constructive skill of no mean order.

True pendentives are the curved triangular portions of a hemisphere—the radius of which is half the diagonal of the square below—which remain when its sides are cut off vertically and its top horizontally. In place of pendentives the Byzantines sometimes substituted corbelling, and sometimes semi-domes across the angles of a square, which are often termed pseudo-pendentives. Corbels were principally employed above an octagon, stones being laid across the corners, making the plan 16-sided, then more stones, so that it became 32-sided. From this form the change to a circle presented no difficulties. This was the method adopted in the octagonal church of S. George Ezra, in Syria, of the sixth century. The pseudo-pendentive is more common in churches of the second period than in those of the first, especially in the larger churches. It changed the space to be domed from a square to an octagon, and then by the aid of small pendentives, or by corbels, a circle was formed.

Simple and compound domes.

Domes are of two kinds, simple and compound. In the simple dome, the dome and the pendentives are in one; and the height is only a little greater than that of an intersecting vault formed by semicircular arches.[1] The dome over the central part of the tomb of Galla Placidia, at Ravenna, and those over some of the aisles at S. Sophia, are of this description. In the compound dome, two methods were followed. In both greater height is obtained, and the compound dome was consequently the one used in all important buildings. In one, the dome starts directly from the top of the circle formed by the pendentives; in the other, a cylindrical wall, or "drum," intervenes between the pendentives and the dome, thus raising the latter considerably. The former plan was generally followed in early work, the latter was most frequently employed in buildings of the second period, but there are many exceptions to this. Some of the early churches of Justinian, now destroyed, are said to have had drums, and many of the second period are without them.[2]

[1] It is greater because the radius of the dome is half the diagonal of the square, whereas the radius of a vault is half the width of a square.

[2] The "drum" is universal in all domed churches of the time of the Renaissance, when it received special treatment, and became a most important feature.

Lighting of domes.

In churches with domes without drums, windows are in the dome itself, immediately above the springing; otherwise, they are in the drum, and the surface of the dome is generally unbroken. At the monastery of S. Luke, in Phocis, Greece, are two churches of the eleventh century side by side, the smaller of which has a drum with windows in it, whereas the larger church has no drum, and the windows are in the dome. This fact, however, is not apparent from the outside, because the lower part of the dome is surrounded for half its height by a vertical wall which forms a pseudo-drum, from which the dome, of double ogee form, appears to start (see Figs. 171, 172). Many of these drums are not circular in plan externally, but are many-sided, and the angles are often enriched by marble shafts. The carrying up of the walls vertically is a good expedient constructionally, as it provides weight above the haunches of the dome and helps to neutralize its thrusts. In the churches of the second period, at Constantinople, Salonica, Athens, and other parts of Greece, in which the true drum occurs, it is of considerable height and is generally eight-sided. Windows come at each side, and over the windows are arches which cut into the dome (see Fig. 173).

Construction of domes and vaults.

Byzantine vaults and domes, unlike Roman ones, are of no great thickness, and are generally built of brick, although in some cases cut stone was employed. In a few instances, domes are constructed entirely of hollow earthenware jars, or urns, so formed that the end of one jar fits into the mouth of another. Of this character are the domes over the Church of S. Vitale and the baptistery, at Ravenna. These have flat-pitched timber roofs above them to protect them from the weather.

The Byzantines adopted many expedients to avoid the use of wood centering, most of which they learnt from the workmen in Asia Minor, who, from the earliest times, had been obliged to dispense with timber to a great extent, owing to its scarcity. In many of their vaults, both barrel and intersecting, only the lower portion, which could be built without centering, is laid with radiating courses in the usual manner; the bricks of the upper portion being placed as in the Egyptian, Assyrian, and Sasanian vaults already described. For their small domes of stone the only centering consisted of a revolving central post, with rods fixed at the top which could be moved at will to wherever support was required. One rod defined the intrados of the dome, the other the extrados. The stones were laid with quick-setting cement,

and the work probably proceeded in the leisurely manner characteristic of the East, one course being allowed to set before the next was added. In their brick domes the beds of the bricks do not radiate to the centre of the dome, but, approximately, to the springing line on the opposite side. A little "coaxing" was required at the apex, to close the aperture, but otherwise there was no difficulty.[1] Altogether Byzantine construction is more skilful than Roman; there is less of brute strength about it, and more science; although it is only fair to state that, with the exception of S. Sophia, Constantinople, which has a wider span than any Roman example except the Pantheon, the buildings are much smaller and the difficulties to be overcome consequently not so great.[2]

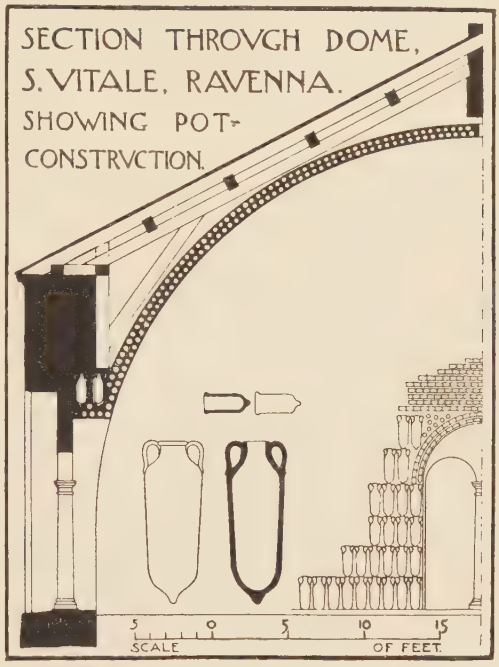


FIG. 144.

The Byzantine builders, although they adopted the plan of few and large piers, made these more slender than the Romans did, and consequently seldom employed concrete. Their walls and piers are generally built of brick throughout, although stone was sometimes used where greater strength was required. The bricks, like the Roman ones, are large and flat, about $1\frac{1}{2}$ inches thick, and the mortar-joints are generally of the same thickness. Externally

Construction and materials.

[1] The domes are not always hemispheres; in a few cases they are four-centred, and the top is pointed, as in the majority of later Moorish domes. The longer, straighter sides rendered easier the laying of the bricks. In the East, to this day, they still construct small stone domes on a centering of twigs and mud, which is allowed to harden, and is removed after the dome over has set.

[2] The different methods of construction are well described and illustrated in M. A. Choisy's "L'Art de Bâtir chez les Byzantins."

the walls are sometimes faced entirely with stone, but more often courses of brick and stone are used together in varying proportions. In the magnificent walls and towers which guard the land side of Constantinople—built chiefly in the fifth century, but many times repaired—the brick is merely used in bands of about five courses each, with from five to ten courses of stone in between. In S. Irene, and in other churches at Constantinople, the walls are built in two or three courses of brick and single courses of stone in turn; and in the churches of Greece, especially in those at Athens of the eleventh and twelfth centuries, single courses of stone or marble, and brick alternate. In most of the last named, bricks on edge are also placed in the vertical joints between the stones. This has an extremely good effect when both materials have mellowed, and the differences of colour are in consequence not too marked; but in modern work the contrasts are too strong. The exteriors otherwise are generally plain, and rely more on their proportions and scale than on their detail. The aim was for breadth more than for height. The dome visible from the outside is always the same as is seen from the inside, an internal dome never being covered and protected by a higher external one, as was common in the days of the Renaissance. Lead, cement, or, in late work, tiles were laid direct on its extrados. Barrel and intersecting vaults were finished in the same manner (many have been covered subsequently by protecting timber roofs); and although their semicircular outline appears strange to Western eyes, accustomed to sharp-pitched gables, the effect is by no means unpleasant, as the rounded top forms a fitting finish over many a wide semicircular-headed window, and is in perfect keeping with the dome that always accompanies it (see Fig. 157).

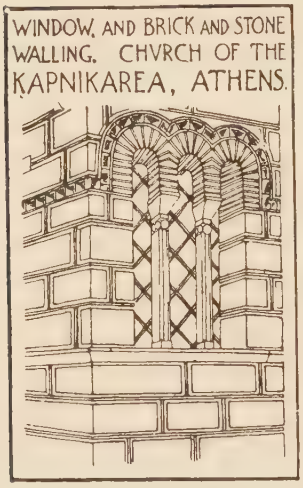


Fig. 145.

As relief to the plainness of the walls sometimes brick and stone, or marble, cut into diamonds, triangles, and squares, are arranged in bands, as in the building known as the Palace of Belisarius at Constantinople. A kind of ornament, peculiar to

work of the second period, is obtained by chipping the edges of ordinary long thin bricks, and setting them in mortar so as to cover the portions chipped away. Good examples of this, both in panels and in bands, occur in Greece, in the Church of Daphni and in S. Luke of Stiris, in Phocis.

Fig. 146.
Schultz & Barnsley (British School at Athens).

String-courses.

The Byzantines abandoned altogether the classic entablature, and even string-courses are used sparingly. These often consist of merely a plain band of marble with the lower portion chamfered. A favourite string-course in buildings of the second period is constructed of thick bricks set diagonally between two thin courses, and this detail is also used as a hood-moulding over a window, when it is frequently continued vertically down its sides until it reaches the sill.[1]

Internal decoration.

The simplicity of the exteriors is atoned for by the richness of the interiors. All the decoration is of an applied character; that is to say, the carcase of the building was built first, and allowed to take its bearings before the mosaics and the marble linings for the doors, windows, and walls were added. Great rapidity in building was consequently possible, and, in addition, no injury could result to the decorations through the dampness inherent to new work, or through unequal settlements. The lower portions of walls are panelled with thin big slabs of marble, cut so as to show their "figure" to best advantage; and the upper parts, together with the vaults and domes are often covered entirely by glass mosaics. The groundwork of the latter in most cases is plain gold, which forms a charming relief to the figures and ornament in colour. In a few early mosaics, such as those in the baptistery, Ravenna, and in the tomb of Galla Placidia, the background, as well as the figures and ornament, is in colour, blue and green being predominant throughout. The figures in Byzantine mosaics are simple in outline and dignified in appearance; the forms and draperies being somewhat stiff and conventional. This is undoubtedly the treatment best suited to the material, as later

[1] In Syrian churches of the sixth century the hood-moulding is often continued in the same way, so it appears to have been a favourite custom in the East for many centuries, although it is seldom met with in Western work.

work of a more pictorial, more realistic character proves. No mouldings or ribs ever break the surfaces of vaults or domes. These are purposely left plain in order that the mosaic pictures shall form the sole decoration. Mosaics, in addition to their artistic beauty, possess the great virtue of rounding off all arrises. By their aid window jambs and wall surfaces appear to melt into one another, and many an awkward bit of construction, such as when corbellings or pseudo-pendentives are used below a dome, is softened and made pleasant by the glittering coat which covers all faults. This simple treatment of unbroken surfaces helps more than anything else to render the Byzantine interiors so impressive. Often the only moulding visible is the simple abacus, consisting of a fascia and chamfer, which forms the capping to the big piers at the springing of the vaults. The proportions consequently are allowed to tell by themselves, and as these are, as a rule, exceedingly lofty, an excellent effect is produced. Figure sculpture in the round was not permissible in the Greek church, as it was regarded as savouring of Paganism—in this respect Byzantine art is inferior to mediæval—but nothing can exceed the beauty of some of the carvings.

Carving.

Byzantine carving is not deep; it is sometimes little more than incised work, and the modelling is often slight. But it must be remembered that the material used is in nearly all cases marble, and that the deep undercutting suitable for soft stone would have been unsuitable for hard. The Byzantines loved the interlacing endless knot. They carved it on their capitals, as in S. Vitale, Ravenna, and on the slabs of their pulpits, parapets and fittings generally. Although they undercut sparingly, they used the drill freely at all periods, to form little holes of deep shadow (see Fig. 107). The finest mural carving is in the spandrils over the two tiers of arches in S. Sophia, Constantinople. All of it is very beautiful, but it is so flat that the ground of the upper spandrils has been filled in with black marble, in order that the pattern shall tell better from below. As a matter of fact, it is doubtful if this filling-in has achieved its object, as the lower spandrils, the carving of which is not treated in this manner, are by far the more effective now that the interstices are darkened by dirt.

Capitals.

The variety in the capitals is endless. It is true that in the finest churches, S. Sophia, S. Vitale, etc., capitals in similar

FIG. 147.—CAPITAL IN GALLERY, S. VITALE, RAVENNA.

[*To face p.* 220.

Photo: P. Sebah and Joallier.

FIG. 148.—SIDE ARCADE, S. SOPHIA, CONSTANTINOPLE.

[*To face p.* 221.

positions are substantially alike, slight differences only being perceptible owing to the fact that the workmen were left free to carve the given design according to their lights. The result is, that a fine broad effect is produced, and yet a hard mechanical appearance is avoided. The dosseret over the capital is found at Salonica, Ravenna, and Rome, but it is an unnecessary device, if the capital is especially designed for its situation, and was never popular in Constantinople. At S. Sophia, it only occurs over some of the subordinate capitals, and not over the principal ones. The design for the latter consists of a square abacus, under which is a beautiful carved block of convex outline with a small volute at each top corner. This form suggests a descent from the old Doric echinus capital of the Greeks, and is by far the most suitable of any to employ under an arch, as it possesses the appearance of great strength, and combines well with the curve of the arch above. Many Byzantine capitals are free renderings of antique Corinthian ones; many others follow more the S. Sophia form, the most effective of the latter being carved in imitation of basket-work, with considerable under-cutting.[1] The different forms can be well studied by a comparison of the capitals of S. Sophia, Constantinople; S. Vitale, Ravenna; S. Mark's, Venice; and the churches of Ravenna and Salonica generally.

Columns.

The columns are as a rule monoliths of marble, like those in Roman work and are entasised. Occasionally columns are met with, which are not of the usual cylindrical form, but are oval in plan. Such are those in a little tomb at Messina, and in a small ruined Church at Olympia. Many of the columns in S. Sophia have bands of bronze immediately under their capitals and above their bases, which are not so much decorative features as precautions due to the fear that the columns might split or "scale," owing to the weight over them, and to the fact that, being monoliths, they are not placed on their natural bed. A few of the columns are similarly banded in the middle.

Windows.

Windows in the earlier period are either single semicircular-headed openings of no great size, or else are of considerable width, and are divided into three lights by columns or by thin strips of unmoulded marble. These strips are sometimes not more than 3 inches wide, but are 12 to 18 inches deep. Some of the

[1] The San Vitale capitals are undercut, so that the braidings stand away from the ground.

mullions in the second period retain the proportions of the earlier ones, but are enriched with attached shafts of circular or octagonal section (see Fig. 145.) They are placed in the middle of the wall, and have capitals with small projection at the sides, but great projection in front and at the back in order to reach to the inner and outer faces of the wall. They might almost be termed corbels, and not capitals. The lower portion of each window, to about a third of its height, was often filled with thin marble slabs, sculptured on the outside, which allowed the light to shine through to some extent. The upper part was filled with slabs of marble, alabaster, cement, or stone, which were pierced with circles, squares, or richer patterns. A good example is at Grado, and others exist in S. Mark's, Venice, in S. Maria in Cosmedin, Rome, and in many churches in Southern Italy, Greece, and Turkey. All the windows in the restored Church at Daphni (see Fig. 172), are filled with modern slabs, pierced with circles, except one side window at the east end, which retains the old filling-in. The pierced openings were sometimes filled with glass, sometimes left open. Whether the glass was coloured or not seems somewhat uncertain. Messrs. Lethaby and Swainson, in their work on S. Sophia, say that although coloured glass may have been used in the smaller windows of that church, "it is hardly possible to conceive of the great windows being anything else than white glass." This

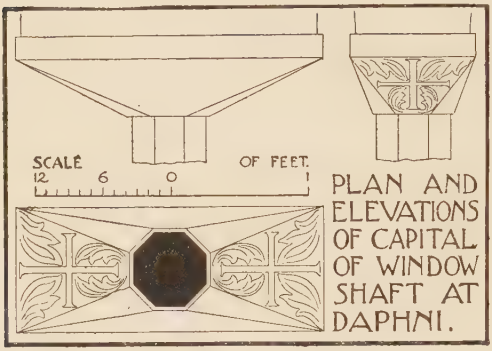


Fig. 149.

Fig. 150.
Jackson (Clarendon Press).

is not quite obvious. The church at present is decidedly over-lighted for æsthetic effect, and the fact that the walls were covered with coloured mosaics by no means proves that coloured glass was not used in the windows. The interiors of Gothic cathedrals were often covered with colour, and yet the windows were filled with stained glass; and the light is so much more piercing in the East than in northern countries, and the love for colour so much stronger there, that no reason is apparent why the two methods of decoration should not have been employed together in the great Byzantine churches.

Plans.

The plans of the churches of the earlier period differ so essentially from those of the later, that it is best to consider them separately when dealing with the examples of each. Some characteristics, however, belong to both periods. Every church has a narthex at the west end, with three doors leading into the building, and often an exo-narthex, or outer porch. Sometimes, in addition, the narthex is continued along the sides, as at S. Mark's, Venice, and S. Sophia, Salonica. The narthex was for the penitents and catechumens who were not admitted to the church. In some instances it was used for the women, although the more usual arrangement was to accommodate them in galleries, which, except in very small churches, were placed over the aisles, and sometimes over the narthex as well. In the Greek Church only one altar is considered orthodox, although more are sometimes found, but nearly every east end is triapsal, as on each side of the central apse, in which the altar stands, is a subordinate apse for the use of the clergy. The central sanctuary, into which no one is admitted except the priests, and the side apses, are always screened off entirely from the church by a high screen, or iconostasis, which, in poor churches, is now often of wood painted with figure subjects, but which in more important churches was of marble, or even of silver as at S. Sophia. Fragments of these screens exist in many churches in Constantinople and elsewhere, but the silver iconostasis of S. Sophia, and the other treasures of the church were destroyed, or carried away when the city was taken and sacked by the Venetians and French in 1204, during the fourth Crusade. Thus the finest church in Christendom was despoiled by Christians, who did far much more damage to it than the Turks, when they captured Constantinople two and a half centuries later.

Churches of the First Period.

The churches which belong to the first period and which form satellites, so to speak, round the central triumph, S. Sophia, are some of the most interesting and inspiring in existence. They are interesting because they are anterior to, or contemporary with, the great church at Constantinople, and they are inspiring because of the rare beauty and originality of their plans and the great charm of their proportions and details. The principal examples, the only ones of which mention need be made, all belong to the sixth century. The Church of S. George, at Ezra, *c.* 515; the baptistery, or small Church, at Kalat-Seman, *c.* 550, both in Syria; SS. Sergius and Bacchus, Constantinople, dedicated 535, two years before the completion of S. Sophia; S. Lorenzo, Milan, *c.* 530; and S. Vitale, Ravenna, commenced about 526, but not dedicated until 547.

In all these churches the central dome is the crowning feature. In plan they are externally either square, as at Ezra and Constantinople, or octagonal, as at Ravenna. In each the interior consists of a large central space divided from an enveloping aisle by piers, between which, in most cases, are niches formed by columns arranged in a semicircle. These niches are characteristic of early Byzantine work, and do not exist in churches of the second period. They are always two storeys in height, and finish with semi-domes. By their aid, variety is given to the plan, additional space to the central area, and scale to the building. In the latter respect they perform the same duty as the columns in front of the recesses in the Pantheon, but they are architecturally even more effective, and the vistas through them equal, if they do not surpass, those obtainable in much larger churches of mediæval plan.

The Syrian examples.

The Syrian examples are more Roman in feeling than the others, and must be regarded as connecting-links between the Roman and early Christian domical buildings already described and those of purely Byzantine type. The Church at Ezra consists of a square, with niches in the four corners, which encloses a central octagon. Piers are used at the corners of the octagon; and these mark a new development, as hitherto, in buildings of similar plan, columns, either single or coupled, had been used at these points. The dome over the octagon is not hemispherical,

but pointed, and of the kind common in the East from a very early period. It is raised on a low drum pierced with windows, which shows that the drum was an early expedient. At Kalat-Seman is another square church—or it may have been a baptistery—the aisles of which enclose a square, which becomes an octagon by the insertion of niches in the four corners. Alongside it is a church of the usual basilican type with nave and aisles—a dual arrangement which was formerly far from uncommon. The domed Church of SS. Sergius and Bacchus, at Constantinople, had originally a basilican church joined on to it, and examples of churches of different form side by side still exist at Torcello and at Trier.

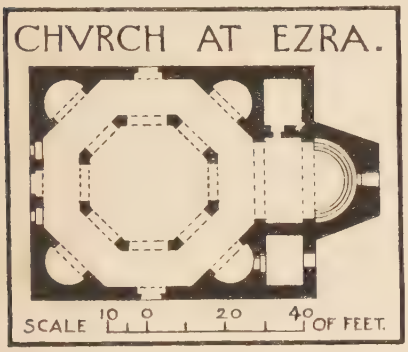


FIG. 151.
De Vogüé (Beranger).

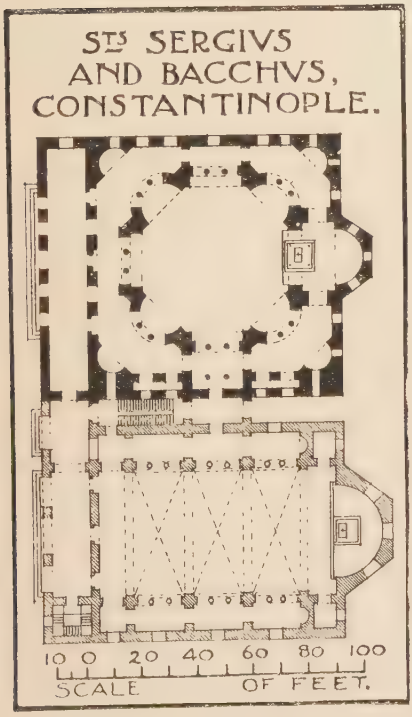


FIG. 152.

The existing Church of SS. Sergius and Bacchus, at Constantinople, resembles the church at Ezra, with the addition of colonnaded niches on four of the sides of the inner octagon. Columns also come between the piers on the other four sides; and these, together with those in the niches, help to carry the gallery which runs round the church over the aisles. The early date of the church is shown by the fact, that although the columns of the gallery level have arches over them, those of the ground floor support lintels, which form a continuous entablature round the

SS. Sergius and Bacchus.

central area. The mouldings of this entablature are debased, but by no means coarse, and on the frieze is a raised inscription in Greek letters. This is practically the only example of Byzantine work in which the classic entablature is retained. Under the stimulus supplied by Justinian, the Byzantine Greeks soon learnt to dispense with it altogether; and although an apology for a cornice exists at S. Sophia in two or three places, its reign was over. Except in certain parts of Italy and the South of France, where old traditions lingered long, it disappeared entirely, and was not seen again until resuscitated by the Italian architects of the Renaissance in the fifteenth century. The dome of this church is pierced by eight windows, just above the springing, which amply light the central octagon. Its height from the floor to the apex is about 70 feet.

S. Vitale, Ravenna.

Slightly larger in size, and similar in construction and plan, is S. Vitale, Ravenna. The exterior, however, forms an octagon,

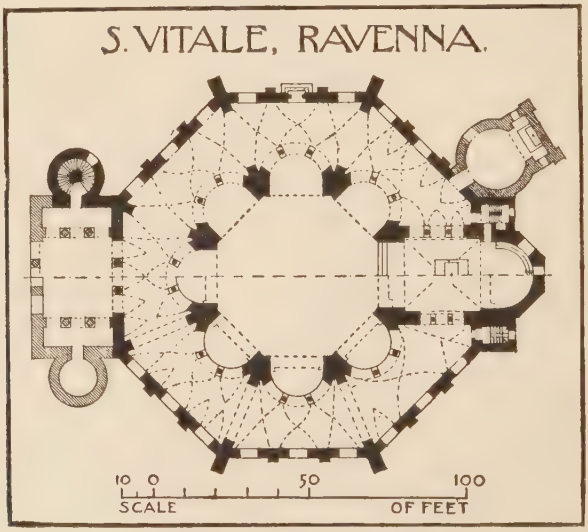


Fig. 153.

and not a square; and every side of the inner octagon, instead of each alternate one, has its apse, with the exception of that at the east end, which forms the entrance to the bema. This is wider than the others, to emphasize its importance, and the gallery stops against it on either side. The walls of the church are lined with marble, very effectively arranged in panels of deep

red, framed in by cippolino, or some other light-coloured marble. In no other church is the beauty of the "figure" displayed so skilfully. Most of this lining still remains, together with some of the old mosaics in the chancel; but the dome and other portions of the church have been barbarously modernized. An intersecting vault covers the aisle, the plan of which occasioned many difficulties which have been successfully overcome. Altogether, this is one of the most effective interiors in existence, and few churches of even larger size are more imposing. The outside, as usual, is very plain; the walls are built of large flat bricks with thick mortar joints; and, as at S. George, Salonica, the dome is completely hidden by walls and by the flat-pitched roof above. Whether the original roof was similar in design, is impossible to say, but in any case some covering must have been used as a protection to the dome of pottery below. This example, and S. George, Salonica, show that the mediæval men were by no means the first to protect thin vaults by outer roofs (see Figs. 141, 144).

Little remains of the original Church of S. Lorenzo, except its plan, but that is one of the most interesting and original in

San Lorenzo, Milan.

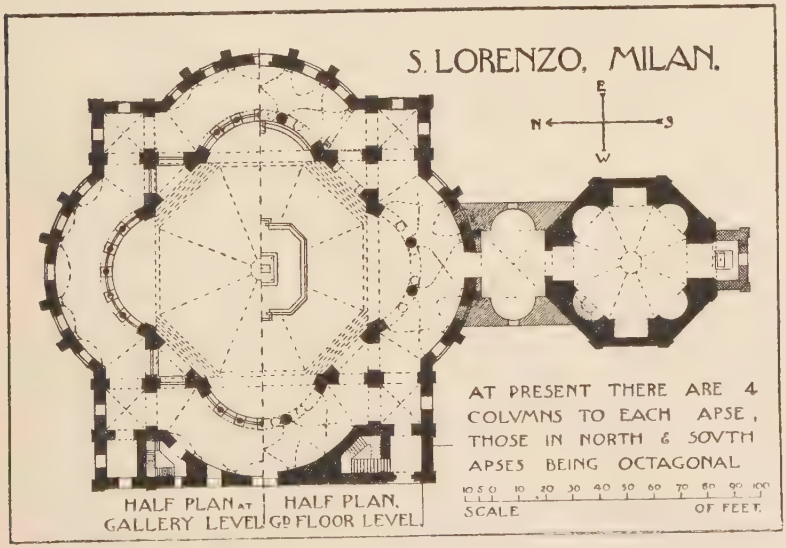

S. LORENZO, MILAN.
E
N
S
W
AT PRESENT THERE ARE 4 COLVMNS TO EACH APSE, THOSE IN NORTH & SOVTH APSES BEING OCTAGONAL
10 5 0 10 20 30 40 50 60 70 80 90 100
SCALE OF FEET.
HALF PLAN AT GALLERY LEVEL
HALF PLAN. GD FLOOR LEVEL

FIG. 154.

existence. Burnt in the eleventh century, and restored in the following, it suffered again brutally in the sixteenth century, when

the dome fell and had to be rebuilt. To this period are due the coarse detail and rococo decoration which now disfigure the interior, and prevent the full beauty of the plan from being apparent. The church forms a square, with a projecting apse on each side. These apses are of somewhat flat curve, as they are concentric with the internal colonnaded apses round the central area. That consists of a square converted into an octagon by walls, pierced with openings, built across the corners. The effect of these arched openings is extremely happy, although it is possible that originally the corners were solid, with the exception of a niche in each, as at Ezra. The columns of the internal apses on the north and south sides are octagonal in plan, and have a somewhat curious effect, as each has a diminution and an entasis.[1] The dome is about 70 feet wide, and if it were the original one would be the second widest of Byzantine domes.

S. Sophia, Constantinople.

The original basilican church, built by Constantine at Constantinople, and dedicated to the "Divine Wisdom," was totally destroyed by fire at the commencement of Justinian's reign, and the new church was commenced under the auspices of that emperor in February, 532, and was dedicated on the 26th of December, 537. To build such a church in less than six years was a wonderful feat, notwithstanding that much of the internal decoration, owing to its applied character, could be added after the formal dedication. The architects were Anthemius of Thralles, and Isidorus of Miletus. Procopius, the author who sang the praises of the architectural work inaugurated by Justinian, in his book published 538–9, gives a long account of the building, and says that both architects at times grew frightened at the magnitude of their undertaking, and when in difficulties consulted the emperor—a little bit of flattery worthy of a poet-laureate.

Plan.

In plan the church is nearly square. At the west end is a narthex with an exo-narthex beyond, and at the east end a slightly projecting apse semicircular internally, and three-sided on the outside. As regards the interior, no church in the world can compare with it in architectural effect. This is not due to the area it covers, because many churches surpass it in that respect, or to its mural decorations, fine though they are; but to the originality of its plan, the extent of its nave, and to the perfect proportions which exist throughout between its different parts. The side aisles, with

[1] These columns are evidently part of the original building, and two probably stood in each of the four apses.

the galleries over them, are so separated from the nave by screens of columns and the great piers, that the nave may be said to stand by itself. It forms a magnificent hall, over 20 feet wider than any of the great Roman halls—far wider than the nave of any Gothic cathedral; and although the cathedrals of Rome and Florence have central areas which in themselves are wider than the nave of S. Sophia, neither can boast of an unbroken floor-space of over 100 feet in width, which extends for over 200 feet in length. This is the case at S. Sophia; the nave is 106 feet wide, by about 225 feet long. Each end terminates with a large semicircular apse of the full width, out of which open smaller apses on each side. Messrs. Lethaby and Swainson suggest that this bi-apsal arrangement was due to the change in the orientation of churches, already referred to (which took place between the building of the original church and the existing one), which would necessitate reversing the position of the altar. But even supposing that some use was made of old foundations, the present western apse cannot occupy the position of the one which served as chancel to the original church, because not even old S. Peter's at Rome had a chancel apse approaching in width the 100 feet which is the span of the semicircular ending at S. Sophia. The peculiarity in the plan is more likely due to natural development. Buildings with apses at both ends were by no means uncommon in Roman work. An oblong chamber in the Baths of Diocletian, Rome, terminates in that manner, and so did the porches of the Baptistery of Constantine, and the Tomb of Costanza, Rome.[1] The idea of this great central hall may, in fact, be claimed to be essentially a Roman one. At first sight there is not much likeness between a building such as the Basilica of Constantine and this church, but on analysis they will be found to have much in common. In each the central space is covered by three divisions, but at S. Sophia a dome and two half-domes take the place of the three intersecting vaults of the Roman basilica. It is, of course, true that there is a poetry in the plan of the Eastern church

[1] In an early basilican church at Orleansville in Africa, and in other churches of later date elsewhere, notably in Germany, apses containing altars are found at both ends; but these churches have little in common with S. Sophia, which can never have had two altars, because dual altars are contrary to the custom of the Greek Church, and because the position of the narthex, in the customary place at the west end, effectually disposes of the idea that an altar can ever have been placed there.

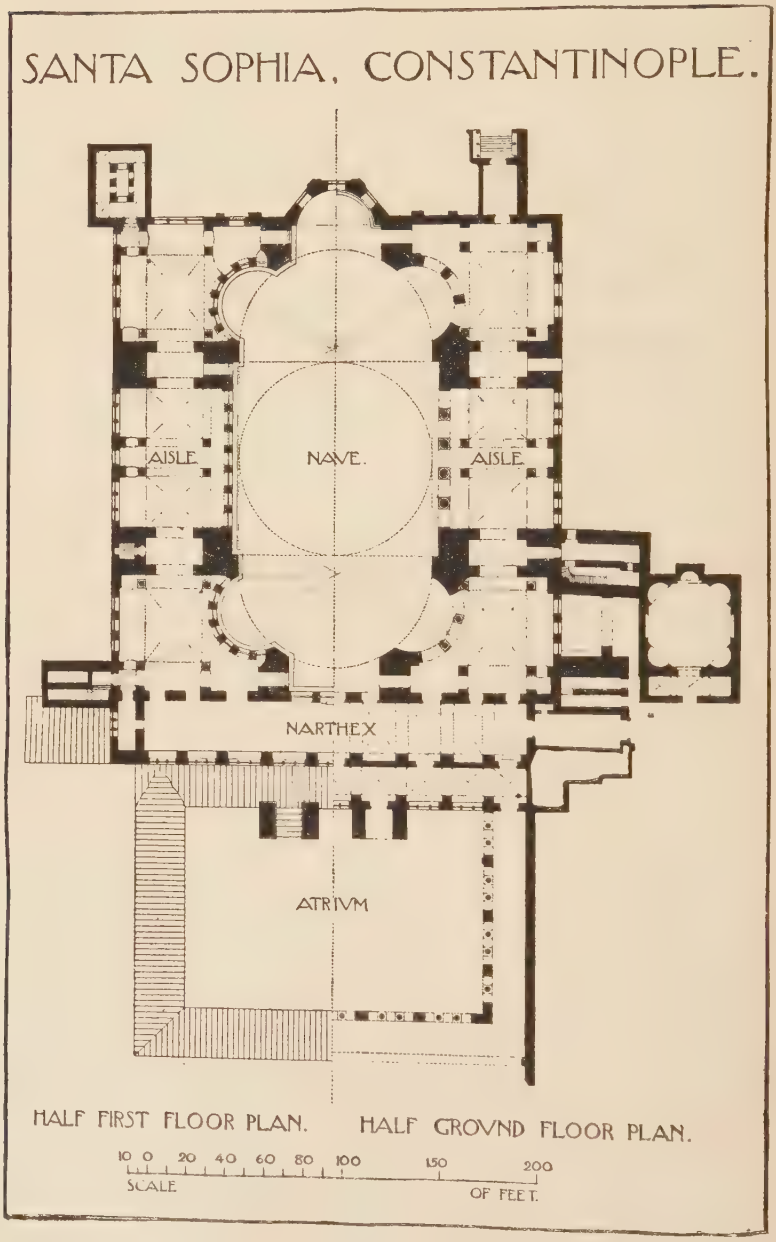

SANTA SOPHIA, CONSTANTINOPLE.
AISLE
NAVE.
AISLE
NARTHEX
ATRIVM
HALF FIRST FLOOR PLAN.
HALF GROVND FLOOR PLAN.
10 0 20 40 60 80 100 150 200
SCALE
OF FEET.

FIG. 155.

which the Hall of Justice cannot lay claim to for an instant, but in the main proportions, in the disposition of piers and external buttresses, and in the columns which divide the centre from the sides, there is considerable resemblance between the two buildings. Where the church is so far superior is in the heightening of the central portion by a dome on pendentives, so that it becomes the crowning feature of the interior to which all the other parts lead, and on which the eye insensibly rests immediately on entering.

Supports of central dome.

The dome is supported on its east and west sides by tranverse arches, beyond which, the same height as the arches, are the semi-domes. These are cut into by the smaller semi-domes over the side apses, and by the central apse at the east end, and the arch over the opening to the gallery at the west end. The semi-dome over the central eastern apse is a trifle higher than those over the side apses, and might have been higher still with advantage, in order to emphasize further the sanctuary. On the north and south sides of the central square are longitudinal arches, the same height as the transverse ones, and between these four arches are the pendentives, the largest triangular pendentives in the world.[1]

Considerable abutment was necessary to take the thrusts of the great transverse arches running north and south. This is provided by immense masses of masonry, 75 feet in depth, and 25 feet wide, which are carried across the aisles on arches, as in the Basilica of Constantine, and stand up above the aisle roofs. These form the most striking features of the outside. Similar buttresses were not necessary to support the longitudinal arches running east and west, as not only are these partially supported by the walls underneath them, but their thrusts are also counteracted by the big piers which form part of the buttresses to the other arches, and by the semi-domes at the ends.

Screen of columns.

The most original and striking features in the church are the screens of marble columns and arches which support the side walls under the longitudinal arches. These are of great beauty in themselves; but their chief value is not decorative, but practical, in as much as they give scale to the church. They

[1] The domes over S. Peter's, Rome, and S. Paul's, London, start from octagons, and the pendentives are consequently quadrangular; and in the two other largest domes in existence, those of the Pantheon, at Rome, and the cathedral at Florence, there are no pendentives at all, as in the former building the plan is circular, and in the latter the walls below the dome, and the dome itself, are both octagonal.

are two storeys high, the columns of the lower tier being more lofty and altogether bigger than those above (see Fig. 148). On the ground floor there are only four columns on each side, whereas at the gallery level, as though to emphasize their semi-unconstructional character, there are six. The upper ones do not, consequently, come immediately over the lower. The stupendous success of this arrangement is all the more remarkable because it does not appear ever to have been attempted before, or to have been imitated

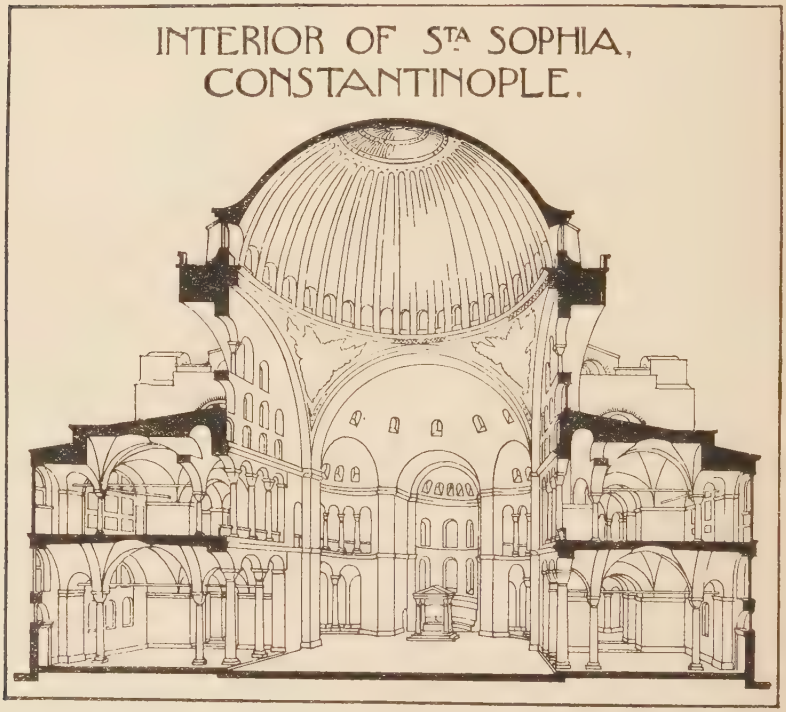


FIG. 156.

since, unless S. Lorenzo, Milan, had a similar disposition of columns (see Fig. 154). Columns and arches of similar proportions form the small apses at the two ends ; and here the super-imposition is even more remarkable, as each apse has only two columns below to support six above.

Lighting. The church is lighted by large windows in the aisles and galleries, by windows in the side walls under the longitudinal arches, and by others in the large and small semi-domes. In

addition, a ring of forty windows surrounds the great central dome, and forms a very remarkable feature, although it is a question if the effect would not have been better if the number had been fewer, and the space between each greater, as in the semi-domes. The church is now overlighted, but such would not have been the case when the windows were filled with pierced slabs, especially if the glass were coloured.

Narthex. The great narthex at the west end forms a very fine entrance porch, 205 feet long and 26 feet wide. Over it is a gallery for the women, which is a continuation of those over the aisles. Some of the finest views of the church are obtainable from these galleries, and from them also the carved marble spandrils, and the mosaics in the upper part of the church can be best studied. Some of these mosaics remain untouched, others have been covered over, but it may fairly be allowed that this church has suffered less at the hands of the Turks than many a mediæval cathedral has, under a plea of restoration, at the hands of the Christians. Even the gigantic circles of green and gold on which is Turkish lettering, although they somewhat tend to destroy the scale of the church, are in themselves fine decorative features.

Dimensions. The following are the principal dimensions:—the height to the cornice which marks the springing of the great arches is 73 feet, and to the crown of these arches it is nearly 130 feet, as they are slightly stilted. This is also the height of the big semi-domes.[1] But this dimension does not convey a true idea of the height of the interior of S. Sophia, because nearly half its central area is covered by the great dome, the apex of which is nearly 180 feet from the floor. This height is far exceeded by that of the dome of S. Peter's, Rome, which is nearly double. It is also less than the height of the internal dome of S. Paul's, London, which, with a corresponding span, is over 200 feet high, but it is questionable if the greater height in these two churches is any advantage.

Exterior. The exterior at first sight causes disappointment, but this feeling gradually wears away. The brick walls are plastered over and distempered red and white in bands in imitation of brick and stone, and the dome, including the sloping walls

[1] It is true that this is not so high as the vaults of Amiens, Beauvais, Cologne, and Bologna cathedrals, and S. Peter's, Rome, but it is as high as Chartres, Rheims, and Notre Dame, Paris, and is far higher than any of the English cathedrals, the average height of which is only 75 feet.

between the windows at its base, is covered with dull lead. None of the rich colouring which one generally associates with the East is to be seen, but the grand simplicity of the dome resting on its plain square base, the great scale of the projecting buttresses on the north and south sides, which stand out boldly as though not ashamed to proclaim their utility, and the great semicircular arches in between them, each 15 feet 8 inches wide on the soffit, more than compensate for the absence of ornament and colour. After all, shadow is the cheapest and most effective ornament a building can have—especially in the East, where it is far more telling than in our colder, more northern clime; and there is plenty of light and shade on the exterior of S. Sophia. The lower portions of the half-domes of the east and west are hidden by sloping walls, and very little of the domes themselves shows. Still that little serves to carry the eye upwards to the central dome, and helps to produce the pyramidical effect so noticeable in this church.[1] The four minarets, added by the Turks in the fifteenth and sixteenth centuries, are, unfortunately, some of the ugliest in Constantinople, but they emphasize the great mass of the church, and therefore are of some value.

[1] The piled-up pyramidical outline is even more marked in some of the later Turkish mosques in Constantinople, which were modelled on S. Sophia.

Photo: Sebah and Joallier.

FIG. 157.—S. SOPHIA, CONSTANTINOPLE.

FIG. 158.—MOSAICS ON DOME, CHURCH AT DAPHNI, NEAR ATHENS.

[*To face p.* 234.

CHAPTER XII.

BYZANTINE ARCHITECTURE: SECOND PERIOD.

THE second period includes the churches built between 700 and 1200 in Constantinople, in Salonica—which, under its old name, Thessalonica, was the second city of the Eastern Empire; in Greece, and in that part of the far East to the north of Persia, known as Armenia and Georgia, which remained Christian notwithstanding Persian persecutions and Mohammedan invasions. Under this heading is also included a few churches in Northern Italy, of which the largest and finest, S. Mark's, Venice, occupies the position amongst the churches of the second period that S. Sophia does amongst those of the first. In other parts of Eastern Europe, in Bulgaria, Servia, and Russia, Christianity had no footing until about the tenth century, and little of interest can therefore be expected in those countries.

The churches of this period are, as a rule, small; not one can compare in size and importance with S. Sophia, and few if any, except S. Mark's, Venice, are as large as the examples described in the last chapter. This is partly accounted for by the fact that in the Eastern Church the greater part of the congregation stood—as is still customary—and did not kneel or sit as in the Western Church; but it is also partly due to the diminished strength and importance of the Empire, and to the constantly recurring external wars and internal dissensions which afforded the people little inducement to build extensively. The churches in Greece, especially those in Athens, are in most cases diminutive, far smaller than the majority of English parish churches. But the old artistic Greek spirit still survived throughout the Empire; and although the churches are small they are often interesting in plan, are always admirable in proportion, and were decorated with a rare richness of marbles and mosaics. One ugly feature, the high drum under the dome, detracts from the outside appearance of some; but this is by no means universal, and nearly all the more important churches are without it.

Table of dimensions.

The following table gives the approximate diameters of the domes in a few typical examples. These dimensions are given in preference to the width and length of churches, because they afford a better idea of their size. The other dimensions are often misleading, as the east end is always cut off entirely from the body of the church by the iconostasis, and the remaining area is generally so encumbered by columns, piers, and walls, that very little is available for service except the space under the central dome.

TABLE OF APPROXIMATE DIAMETERS OF DOMES.

	Feet.	Inches.	
S. Irene, Constantinople	45	0	wide
S. Sophia, Salonica	33	6	„
S. Luke, in Phocis, Greece (large church)	28	0	„
Church at Daphni, near Athens	26	0	„
S. Nicodemus, Athens	22	0	„
S. Elias, Salonica	20	0	„
Church of the Chora, Constantinople	17	6	„
S. Theodore, Constantinople	13	0	„
S. Theodore, Athens	13	0	„
S. Luke, in Phocis (small church)	11	6	„
Kapnikarea, Athens	9	6	„

Plans.

In plan these churches differ in many important essentials from those already described, and, in addition, local characteristics distinguish to some extent the churches of one country from those of another. In one respect they all agree, namely, in having what has been before described as the distinctive feature of Byzantine work, the central dome. Many churches, however, have several domes, in which case that at the intersection of nave, chancel, and transepts is generally the largest, and the others are subordinated to it. In none of the churches of this period are found the colonnaded niches surrounding the central area which form so fascinating a feature in nearly all the early examples. This plan, with all its advantages and artistic possibilities, seems to have come into existence with Justinian—unless, as suggested in modern restorations, it occurred in the Baths of Gallienus, Rome—and to have disappeared at his death. It is a thousand pities that such has been the case, as few arrangements are more effective.

Constantinople and Salonica.

In Constantinople and Salonica no hard and fast rules can be laid down regarding the planning of churches, as great variety exists. This is partly because the churches are often rebuildings

on old foundations, and partly because in many instances alterations made at different times have largely increased the size and affected the plans. No remains exist of the Church of the Holy Apostles at Constantinople, built by Justinian and pulled down by Mohammed II. in 1464, which, according to Procopius, boasted of five domes, of which the central one was possibly raised on a drum. It is especially unfortunate that this church has been destroyed, for if it be true that S. Mark's, Venice, was copied from it, it shows that there must have been a greater variety in church-planning in Justinian's time than existing examples lead one to expect, and also how few were the improvements made subsequently.

S. Sophia, Salonica.

S. Sophia, Salonica, is included here amongst the churches of the second period, although it is ascribed by Texier and Pullan and others to the sixth century. Its details are certainly of that period, but it may have been rebuilt, as in its plan and general ordinance it resembles the churches of later date. If it were built in the sixth century, it is an additional proof of the variety in early plans. Internally, it consists of a cross within an oblong, the central portion of which is covered by a dome and the remainder by barrel vaults. The narthex runs round three sides of the church, as in S. Mark's, Venice. The bema is not quite so wide as the nave, and the apse is slightly narrower still, so that the vaults over these portions diminish in height whenever a break occurs. This diminution in height and width at the east end is a feature of most Byzantine churches, and a very effective one, as it improves the perspective and gives an appearance of greater length. The columns between the big piers on the north and south sides support the gallery front, and give scale like those of its Constantinople namesake. Under the dome is a low drum pierced with windows, which

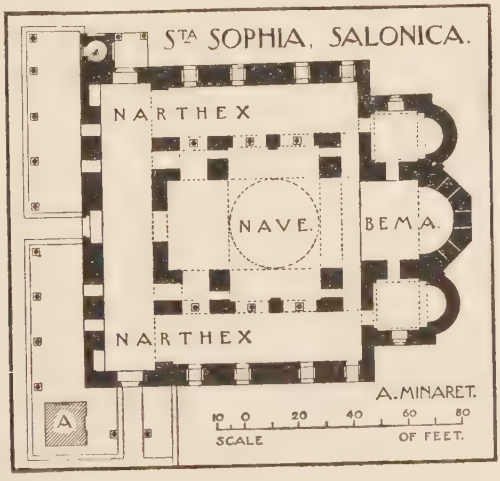


FIG. 159.

may be the earliest instance of this arrangement which remains. The apses on each side of the central bema are cut off from the rest of the church by walls, pierced by narrow doorways which give access to the bema and lateral narthexes. In most churches these vestries are open to the church except for the iconostasis. At Ancyra and Myra, both in Asia Minor, are churches very similar to this one; and two churches in Constantinople, S. Theodore and the Church of the Monastery of the Chora, resemble it in many respects.

S. Irene, Constantinople.

S. Irene, Constantinople, occupies the site of a church built by Constantine, which was rebuilt by Justinian, but the existing

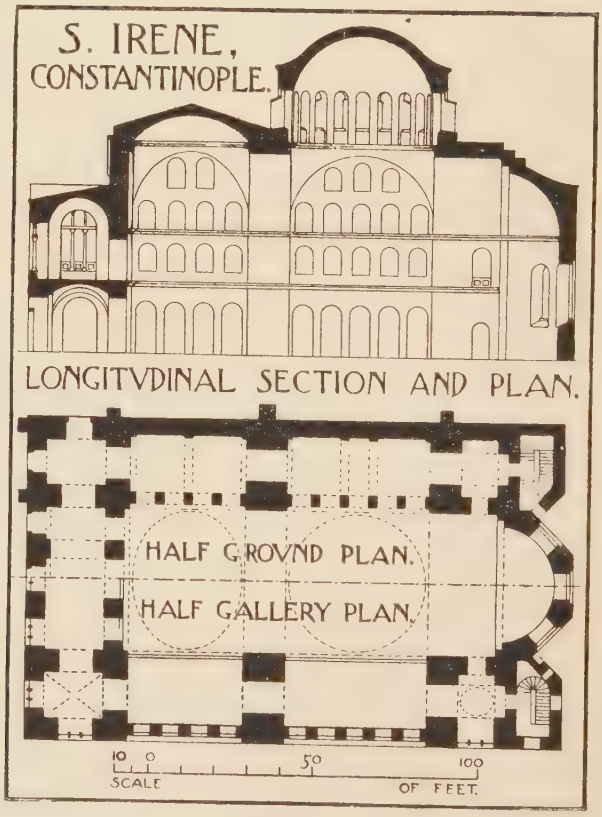


Fig. 160.

church is due to a second rebuilding in the latter half of the eighth century. To some extent its plan is basilican, as it is

divided into nave and aisles, but the church bears more resemblance to the Basilica of Constantine in Rome, than to the more common wooden-roofed colonnaded basilicas and the basilican churches of Italy. The nave consists of two divisions: the easternmost is square in plan, and is covered by a dome which rises above the roof on a drum pierced with twenty windows. Two great piers on each side carry the dome and mark the divisions of the nave. Between these are narrow piers, which support the galleries over the aisles. Above the galleries are wide barrel vaults, reaching from pier to pier, and the aisle walls are carried up to the under side of these, and are pierced with windows similar to those in Roman buildings and in the Church of S. Sophia at Constantinople. It is more than probable that S. Irene, either as originally built by Constantine or as rebuilt by Justinian, consisted of three bays all of the same length. If the former is responsible for the design, then it probably followed the plan of his basilica at Rome—perhaps it was built in the first instance as a basilica. Certainly the great barrel vaults over the aisles are curiously Roman in character and scale, although they may be the work of Justinian. In any case the rebuilding in the eighth century, so far at least as the eastern part of the church is concerned, must have proceeded on the old lines, and possibly much of it was merely restoration. The central dome is said to have been the first placed on a drum, but that depends upon when it was built. It is generally ascribed to the rebuilding in the eighth century. The church is now, and has been for centuries, used as an armoury, and necessary utilitarian alterations have largely destroyed its ecclesiastical character.

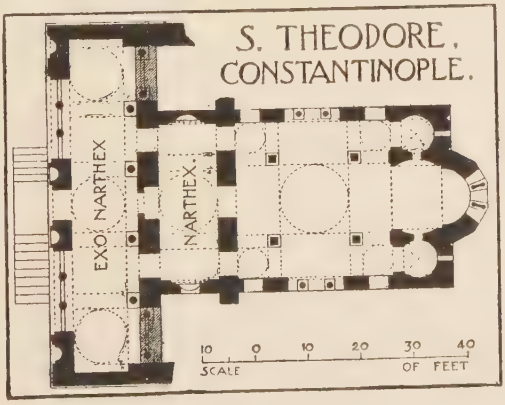


FIG. 161.
Pulgher.

Other Constantinople churches.

S. Theodore, Constantinople (Kilisse Mesjidi), is of old foundation, and the plan, which is an exact square, exclusive of the bema

and the inner and outer narthexes, is probably the same as that of the sixth century church which originally occupied the site. It was, however, rebuilt in the twelfth century, and it is difficult to say how much of the original remains. The outer narthex is two storeys high, and its façade is one of the most elaborate in Constantinople—that is, however, not saying much—although now disfigured by whitewash and patchy restoration. The

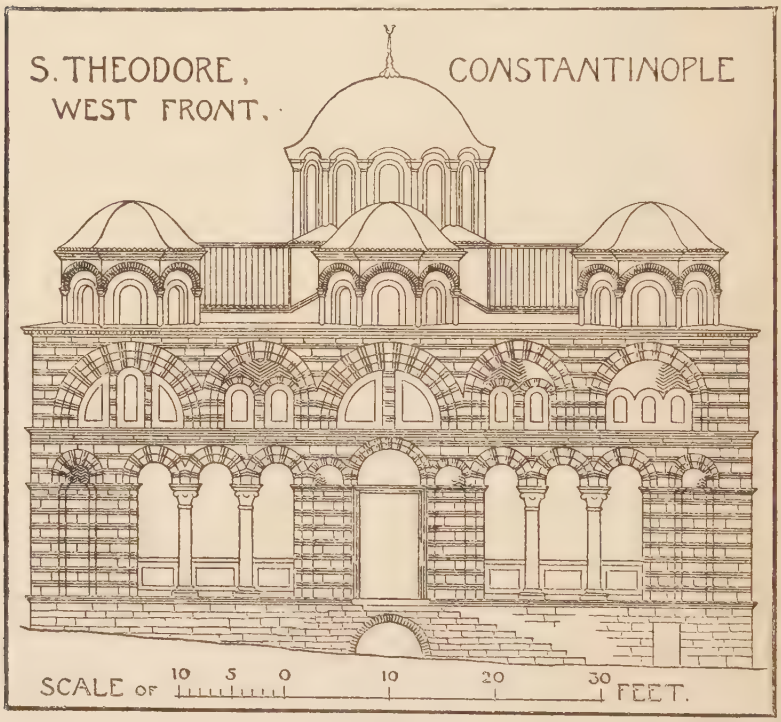


FIG. 162.
Pulgher.

domes are five in number, that over the central part of the church being the largest. Behind this comes another over the middle division of the inner narthex, and the remaining three domes are over the three bays of the outer narthex. All are raised on drums. The Church of the Monastery of the Chora (Kahriyeh Jamisi) has been so much altered by later additions that it is difficult to make out its original plan. The interior is principally interesting because of its fine mosaics, frescoes, and marble

wall-linings, which, after those in S. Sophia, are the best in Constantinople. S. Saviour Pantepoptes (Eski Imâret Mesjidi), in plan resembles the small churches in Greece (see Fig. 174), which will be described later, and altogether is a good example of the type of church which was built by the Comneni in the eleventh and twelfth centuries.

S. Elias, Salonica.

The Church of S. Elias, Salonica, the date of which is stated to be 1012, is noticeable for its square narthex divided by two

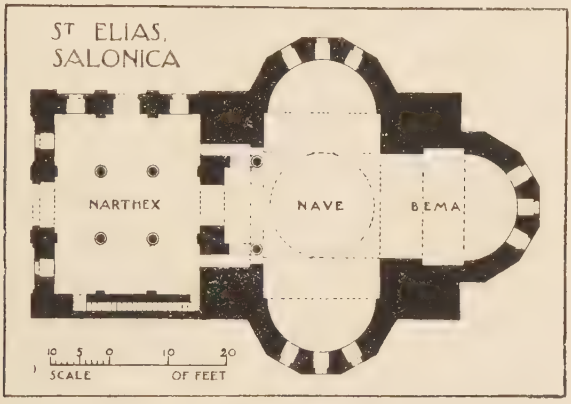


FIG. 163.

columns on each side, and for the fact that the transepts, as well as the bema, terminate with apses. This triapsal arrangement was common afterwards in German churches.

S. Mark's, Venice.

S. Mark's, Venice, owes its present plan entirely to Byzantine architects; and before the outside walls were cased in marble and otherwise bedizened in the thirteenth and fourteenth centuries, it must externally have been similar in appearance to the Church of S. Theodore, and other Constantinople churches. The original church was built in the beginning of the ninth century, but was partially burnt during an insurrection in the year 976. Two years later the restored church, little altered in size or plan from the first, was ready for service, the alterations having been carried out by the Duke Orseolo I. Of this church only the lateral and west walls remain, and possibly portions of walls at the east end. In plan it was of the ordinary basilican type, without transepts of any kind, the nave being separated from the aisles by ten or twelve columns on each side. The east end with its apses was, according to Cattaneo, about 10 feet west of the

existing bema, so that the proportions of the church were similar to those of the neighbouring one of Torcello, built about the same time, although it was somewhat larger. Thus it remained until about 1063, when important alterations were made, which completely changed its plan and appearance, externally as well as internally. The existing transepts were added, the east end was lengthened, the narthex was continued along the sides to meet the transepts, and the interior was entirely remodelled. The alterations, by which a basilican church with wooden roofs was converted into a church of Greek cross plan with domes, can be understood by reference to the plan. The columns were

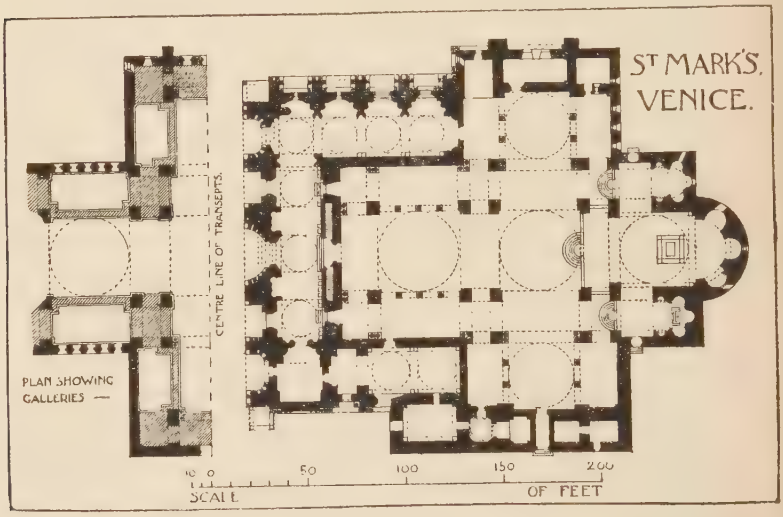


FIG. 164.

removed from the eastern half of the church, and at the crossing four big piers, each the full width of an aisle, were built with corresponding piers at the west end. These piers are pierced with openings, the arched heads of which correspond with the arcades between the piers in the nave and transepts. From them spring barrel vaults, which, branching out on all sides, support the domes. S. Mark's differs in many important respects from S. Sophia, although the spirit which animates both is the same. The latter church has no lateral projections; S. Mark's is cruciform, and has strongly marked transepts. Instead of one great central dome, flanked by two semi-domes, as in the Eastern church, it has five domes, the two largest of

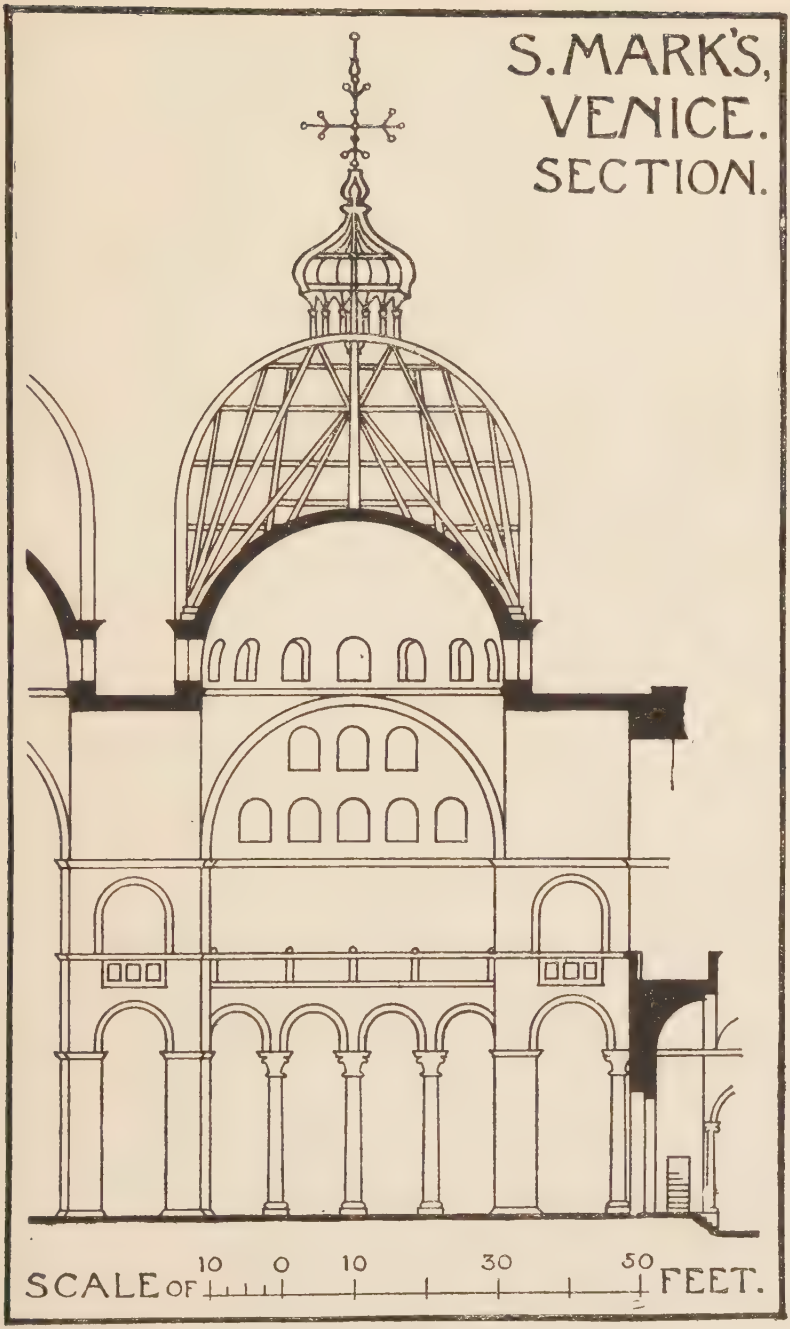


Fig. 165.

which together do not equal, by more than 20 feet, the diameter of the one dome of S. Sophia. And yet S. Mark's, comparatively speaking a small church, looks large, even when compared with its great forerunner, owing to the excellence of its proportions and the skilful disposition of its parts.[1] The transepts and chancel are narrower than the central square and nave by the width of the coupled columns placed on each side against the big piers—a particularly happy method of obtaining the diminution in width before mentioned as characteristic of Byzantine churches. The result is, that the domes over the chancel and transepts are narrower than those over the crossing and the nave. The former are only 33 feet wide, the latter 40 feet. All the domes are separated from one another by barrel vaults, with soffits from 15 to 20 feet wide. The vaults are 50 feet high to the springing, and from 66 to 70 feet to the apex. The crowns of the central and western domes are nearly 100 feet above the floor, the smaller domes being slightly lower. The arcades in the nave and transepts perform the same duty as those in S. Sophia in giving scale to the interior, but there the resemblance ends. In S. Sophia they have a constructive value as well as an æsthetic; in S. Mark's they merely carry mean little galleries, less than 3 feet wide, which lead from one great pier to another. This is undoubtedly one of the principal defects in S. Mark's, and these galleries contrast very unfavourably with the spacious ones of Eastern churches. In Venice the latter would have been useless, as in Western countries the sexes are not separated to the same extent as in the East; but this apology for them was probably retained because the Greek architect wanted an excuse for side columns, which he knew from experience to be so valuable in a design. The aisle walls are pierced with windows, and are carried up the full height of the church to the under side of the barrel vaults, as at S. Irene. The principal lighting, however, is by windows in the domes, sixteen in each, arranged, as in S. Sophia, just above the springing. There are no drums, which is one proof, out of many, that drums were by no means universal in later Byzantine churches. The chancel is raised a few feet above

[1] This remark is not intended to imply that S. Sophia does not look its size, because that it unquestionably does; but no one would imagine on entering S. Mark's, that the whole of the church, except the transepts and narthex, could be put inside the nave alone of S. Sophia.

Photo: Naya.

FIG. 166.—S. MARK'S, VENICE.

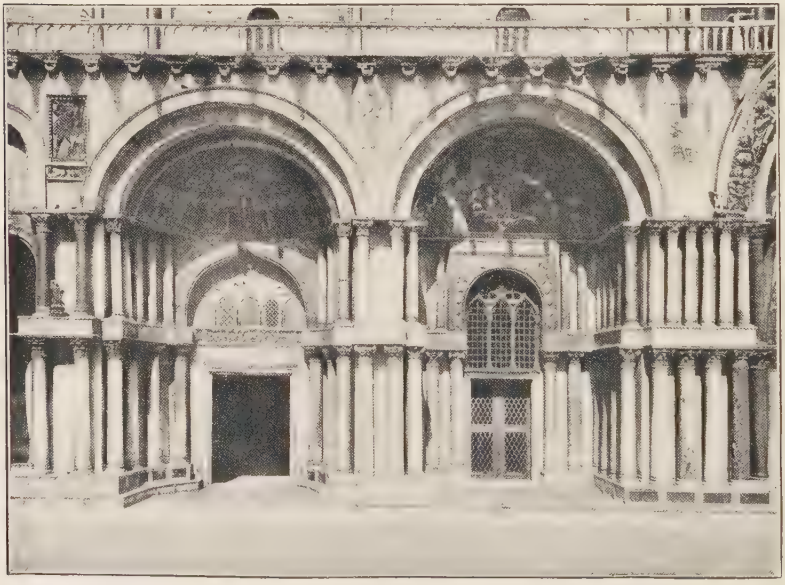


Photo: Naya.

FIG. 167.—PORTION OF WEST FRONT, S. MARK'S, VENICE.

[*To face p.* 245.

the rest of the church, and under it and a portion of the nave are the crypts, parts of which belong to the original church.

Mosaics.

As in other Byzantine churches, mouldings are very sparingly introduced. A string-course here and there to accentuate a springing-line, or to separate marble veneer from mosaics is all that exists. Nothing is permitted to break the surfaces of the vaults, pendentives and domes, although very small cornices enriched with a billet ornament divide the domes from the pendentives. Some of the mosaics which cover the vaults and domes are beautiful; others are detestable,—according to whether they are early or late in date. Nothing could possibly be more effective in a decorative sense, and more suitable for the material, than some of the twelfth and thirteenth century mosaics in the narthex and central dome, in which single figures, or else groups of figures clearly defined, are separated from one another by an expanse of plain gold mosaic; and nothing could be less suitable, and less effective, than the later work designed by painters whose aim has been to produce pictures.

Fittings.

The capitals of the columns throughout show great variety in design and much skill in execution. The principal ones are modified Corinthian crowned by the abacus-slab already referred to in the description of the church at Torcello (see Fig. 126). There is more carving inside S. Mark's than is customary in Byzantine churches, since slabs of various dates, executed for different purposes, have been inserted in the gallery fronts, and in other parts of the church. The fittings are very rich, and include, amongst others, the iconostasis with its fourteen figures of S. Mark, the Virgin, and the Twelve Apostles; the pulpits, one of which is crowned by a bulbous dome of Eastern outline; and the *pala d'oro*, now the altar-piece, an exceedingly delicate and rich example of Byzantine workmanship covered with gold and silver plates, which was executed in Constantinople in the beginning of the twelfth century, although considerably altered later. The famous marble floor, with its mixture of large slabs and small tesseræ arranged in patterns, is very varied in design. Probably nobody now holds the opinion, which was once so loudly expressed and so warmly championed, that the irregularities of its surface are due to design, and were meant to be symbolical of the waves of the sea.

Exterior of S. Mark's.

It is easy to find fault with the outside of S. Mark's; to ridicule its bulbous domes, its gingerbread ornament, its abominable

mosaic "pictures," its huge expanse of glass in the upper part of the big central window,—what this was like originally can be seen in the mosaic over the doorway into the narthex, at the north-west corner,—and its mixture of detail of different dates and periods; and yet, when all has been said, it must be admitted that this long, low, little building has the most fascinating façade in Christendom. Its glamour makes itself felt the first instant it is seen, and increases with each visit. Its charm is partly due to its situation, partly to its colour—nothing could be more delightful than the contrast between the porphyry columns and green marble jambs surrounding the central doorway,—and partly to the fact, that whilst there is sufficient resemblance between the different parts to produce a symmetrical whole, the variety in the detail and the modifications in each division afford endless interest. S. Mark's is veritably a museum, both externally and internally,—a museum, in which capitals and columns, mouldings and carvings, some of the fifth and sixth centuries, others of the time of Orseolo, and the remainder of the eleventh century, mingle with mosaics of all dates, and, on the outside, with mediæval excrescences and florid ornament, which may be of any period from the thirteenth century down to almost the present day. The casing of the external walls with marble was commenced in the thirteenth century, at which time, also, most of the columns which flank the doorways were added. These were mostly brought from earlier buildings of different periods, the impost mouldings which surmount them, and square plinths on which they rest being specially worked to receive them. A curious, but at the same time, a most effective jumble they make. Columns rarely come over one another, or under the arches they are presumably intended to support; in fact, they are arranged with a glorious disregard of statical laws, which is quite refreshing, and which emphasizes thoroughly their unconstructional decorative character. Only a Greek from Constantinople, trained by the columns in S. Sophia to feel how little such things mattered, could have placed six columns over one solitary shaft as is done here at the corners. Little of the original face of the exterior shows except at the sides, where in places the plain brick arches and walls, customary in Byzantine work, are still visible. In the thirteenth century, the low brick domes which show internally were surmounted by lofty lead-covered timbered cupolas of a distinctly Eastern pattern. The effect they produce is bizarre

but not unpleasing, although very contrary to what one expects in a Western church. But Venice can hardly be regarded as a Western city. It occupied such a unique position as the port for the East, that it is only natural that, with the merchandize it imported, should come Eastern art, forms, and ideas. These influenced all Venetian work, but penetrated very little beyond its lagunes. It is true that the great Church of S. Antonio, Padua, built at the end of the twelfth century, and beginning of the thirteenth, adopted the dome instead of the intersecting vault for covering its compartments, but this is one of the few instances in Northern Italy where it was used. Moreover, the domes of this church are very different from those of S. Mark's. They are not at all oriental in character, and they are raised on lofty drums of brick and stone. The rest of this church follows the style common throughout the north of Italy at the period when it was built, and presents few or no traces of either Eastern or Byzantine influence. S. Mark's, Venice, stands alone as regards its style, and also as regards its surroundings. Other cathedrals may boast of a larger atrium; but the piazza of S. Mark's has a charm of its own which no other can approach, and it is probably the only large square in Europe in which the green of nature is totally lacking.

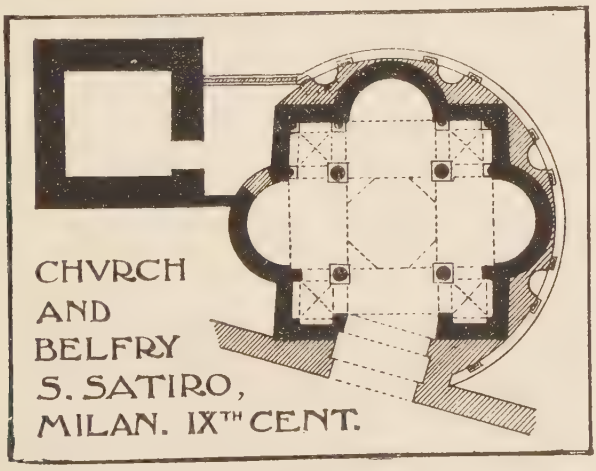


FIG. 168.
Cattaneo (Fisher Unwin).

S. Satiro and S. Fosca.

Two churches in North Italy possess peculiarities in plan which bring them under the head of Byzantine. The first is the little

Chapel of S. Satiro, in Milan, built in 879; and the second, the Church of S. Fosca, at Torcello, near Venice, built in 1008. The Milan example has been altered considerably externally, and partially enclosed by a wall of later date. Originally, it was square in plan, with an apse on three of its sides at least, if not on the fourth,—an arrangement doubtless suggested by the earlier and more important S. Lorenzo of the same city (see Fig. 154). Internally it becomes cruciform, like so many small churches in Constantinople, Greece, Sicily, etc.; and the squares in the corners are vaulted. A somewhat similar arrangement is followed in

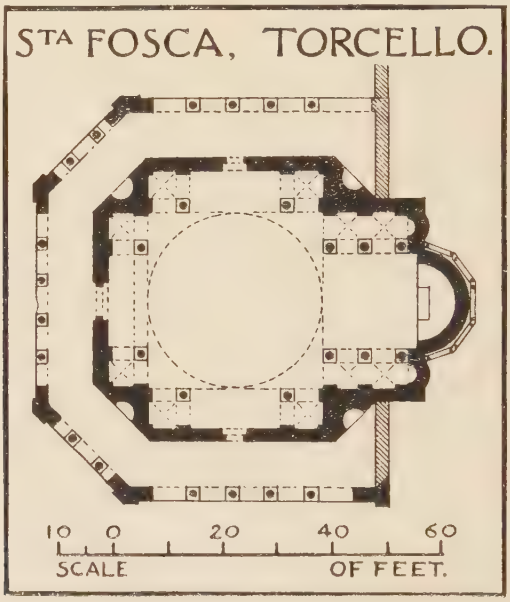


FIG. 169.

the Church of S. Fosca, but the plan here is more elaborate, and the east end is lengthened and divided into a chancel, and side aisles of two bays each. This church and probably the basilican church alongside it, described on pp. 191–2, were the work of the Byzantine Greeks who helped in the first restoration of S. Mark's, Venice, after the fire at the end of the tenth century. (See Fig. 170.)

Churches in Greece.

The churches in Greece of the eleventh and twelfth centuries are generally nearly square in plan, with no projections except one or more apses at the east end. A narthex, sometimes open,

Photo: Alinari.

FIG. 170.—THE CATHEDRAL AND S. FOSCA, TORCELLO. [*To face p.* 248.

but more often enclosed so that it becomes part of the church, is generally added at the west end. Two types are common: one was usually employed for the larger churches, the other for the smaller. In the former, the dome is low but its diameter is considerable, as it covers a central space which is the full width of the bema and two side chapels. In the latter, the dome is raised on a lofty drum, but its span is only the width of the bema alone. From the centre in both types branch four arms, all about equal in length, making the plan a Greek cross (see Fig. 174). The arms are generally covered by barrel vaults, which spring from piers in the larger churches and from columns in the smaller ones. The roofs over these are higher than those over the corners of the square, and finish in front with gables of low pitch, and at the back stop against the walls which support the central dome. The result is that a church which is really square in plan presents a cruciform appearance externally as well as internally. The lofty drums of the smaller churches are generally carried on true pendentives, but in the larger ones the domes usually start from octagons formed by throwing arches across the corners, as before described (see Fig. 171).

Although these churches are mostly small, their appearance inside is most striking, owing to their loftiness. The height of the arms to the springing of the vaults is often as much as three times their width, and the height to the apex of the central dome is frequently considerably greater than the total width of the church. Some of the exteriors are as fine in proportion as the interiors, but this applies chiefly to the larger churches. The stilted dome of most of the smaller churches is not a satisfactory feature; especially when, as generally happens, the heads of the windows in the drum cut into the dome itself.

Large churches.

The best known of the larger type of church are: the Church of Daphni, near Athens, S. Nicodemus, Athens, which has been lavishly restored, and the large Church of the Monastery of S. Luke of Stiris, in Phocis. There is little difference in size between the three. The principal dimensions of the Church at Daphni show that it was set out in simple ratios, and to this the excellence of its proportions is doubtless due. The diameter of the dome is 26 feet, its height just double this, 52 feet, which is also the total length of the church, including the apse but excluding the narthex. The transepts are narrow and lofty; the width being only 9 feet 6 inches, whilst the height

from the floor to the springing of the barrel vaults equals the width of the dome. The church has been repaired and made weather-tight, but luckily no attempt has been made to restore the mosaics on the dome and vaults. In the centre of the former is a representation of Christ in a circle, which is surrounded by an expanse of gold mosaic, and between the windows are little coloured figures set in a gold ground (see Fig. 158). The side walls of the bema are curved in plan, and the flat niches thus formed are domed. This is a peculiarity of the churches of this date in Greece. The exterior shows a typical eight-sided drum and flat dome (the drum is not a true drum, but of the kind

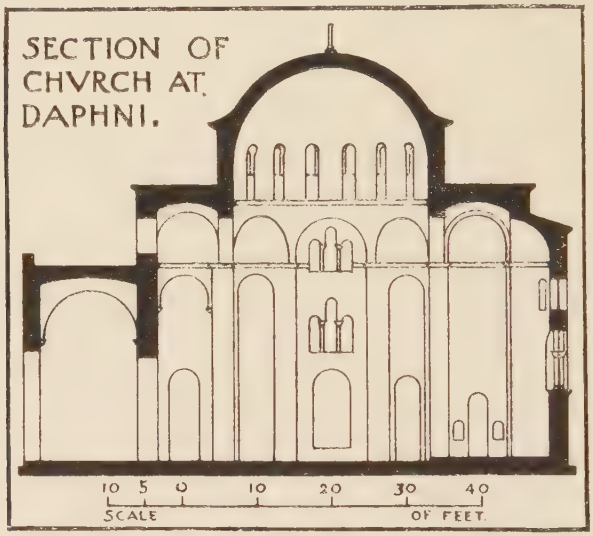


FIG. 171.

Schultz & Barnsley (British School at Athens).

before described), and a very good effect is produced at the transepts, where slightly projecting buttresses form a recess in each, which is carried up the full height of the church, and arched over at the top immediately under the flat-pitched gable. By this means the effect of height which is so satisfactory inside is also obtained outside.

Smaller churches.

Many churches of the second and smaller type exist in different parts of Greece, and Athens itself possesses several examples. Of these, the Church of S. Theodore and that known as the Kapnikarea are the best known. S. Theodore has a small but well-shaped

FIG. 172.—CHURCH AT DAPHNI, NEAR ATHENS: EAST END.

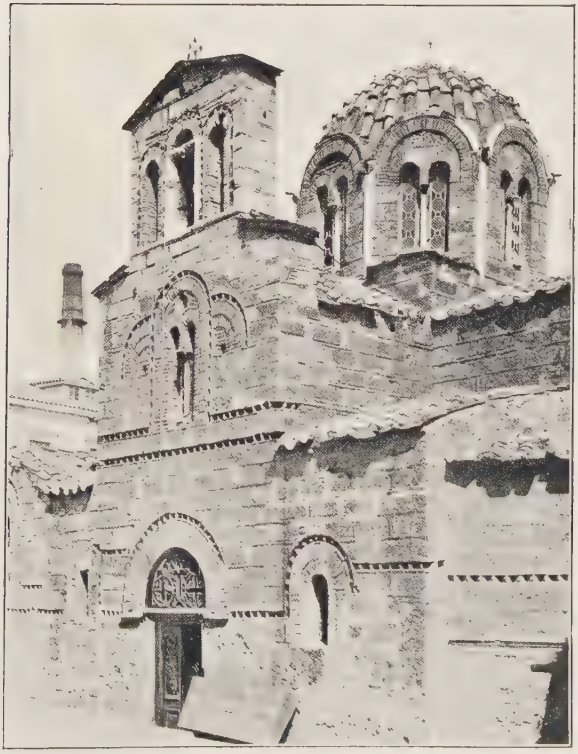


FIG. 173.—S. THEODORE, ATHENS.

[*To face p.* 250.

belfry on the top of the south transept gable, of the kind fairly common in Greece (see Fig. 173). The old Cathedral of Athens requires mention, chiefly because it is probably the smallest building in Europe honoured by the title of cathedral, being smaller even than the Church of S. Theodore, but also because let into the face of the outside walls are many panels and carvings of different dates which are of considerable archæological interest. This is the only church in Greece which is faced entirely with marble.

Church of S. Luke of Stiris.

The monastery of S. Luke of Stiris, in Phocis, boasts of two of the most interesting churches of this period. They stand side by side, and each is an excellent example of its type. The larger church has a plan almost identically the same as that of the church at Daphni—the only difference being that

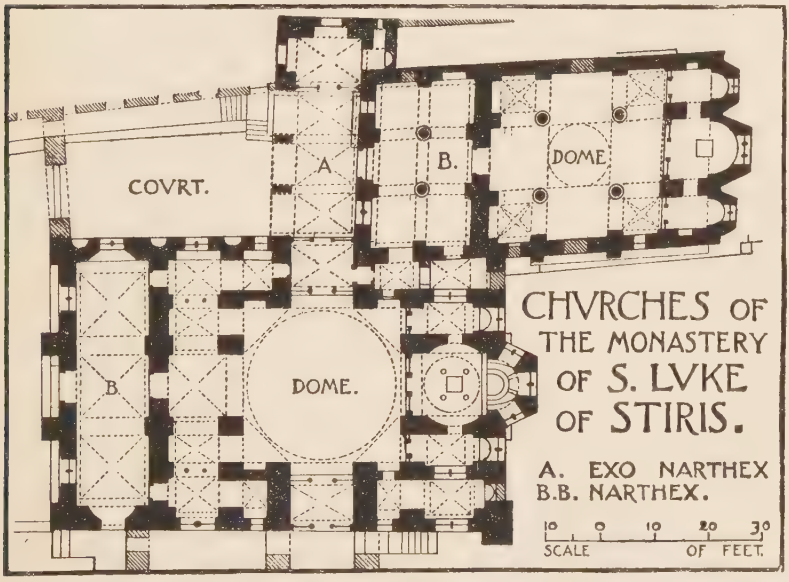


FIG. 174.

Schultz & Barnsley (British School at Athens).

it has only one apse at the east end instead of three,—but it has galleries which the Daphni church lacks. The smaller church in plan and proportion is like S. Theodore, and some of the other Athenian churches. It has in addition a large narthex, divided by columns, beyond which is an exo-narthex which acts also as

a side porch to the large church. Both churches retain their old marble floors, and in the larger church there is also a great deal of mosaic work and marble wall decoration. The lower portions of many of the windows still have their original marble slabs, $1\frac{3}{4}$ inches thick, some of which are carved on both sides so that a fair amount of light filters through them. The heads of the windows are filled with slabs of hard plaster, pierced with circles for glass and ornamented with strap-work and carvings.[1]

Armenia and Georgia.

The churches in Armenia and Georgia resemble in many respects those in Greece, but also possess certain distinctive characteristics of their own. When they were built is somewhat uncertain, as the same detail was used with but slight modifications for centuries; but as the two countries were for some years under Persian rule, and after they escaped from that were subjected to Mohammedan persecutions, it is probable that few, if any, of the existing churches are earlier than the tenth century, and it is more likely that most of them date from the twelfth or thirteenth.

General characteristics.

Some of the churches are square in plan and of the usual Byzantine type, but a number are oblong, the western arm being longer than the eastern. Their interiors are lofty and resemble in proportion the Greek churches just described. In their detail more playfulness is conspicuous than in other Byzantine work, due partly to the close proximity of Persia, and partly to the distance which separated these countries from the centre of Byzantine art. The usual ending for the east end is triapsal, but the side apses are partially embedded and hardly show from the outside. These are separated from the central apse in each example by triangular niches, which are arched over so that the top of the east wall is flush. The domes at the crossings are raised on lofty drums, like those in the smaller Athenian churches, but rarely show externally, as they are hidden by conical roofs of stone. The other portions of the churches are vaulted with barrel vaults, generally semicircular but sometimes pointed. These have no wood roofs over them, the covering of tiles or lead being laid directly on the vaults.

Examples.

Most of the churches are much larger than those in Greece. The Cathedral at Ani is internally about 65 feet wide and 100 feet long, including the apse, and its height to the apex of the vault equals its width. The Church at Ala-Werdi is even larger.

[1] For particulars of these churches, see Messrs. Schultz and Barnsley's work, "The Monastery of St. Luke of Stiris, in Phocis." (*Macmillan*, 1901.)

The Cathedral at Ani is supposed to have been commenced in the tenth century, and finished in 1010. Two inscriptions on the west front are dated 1049 and 1059 respectively. The pointed arch is used inside for the barrel vaults and for the arches under the dome, and this form also occurs in the upper part of the transepts outside. It does not follow, however, that these arches were built at the commencement of the eleventh century.

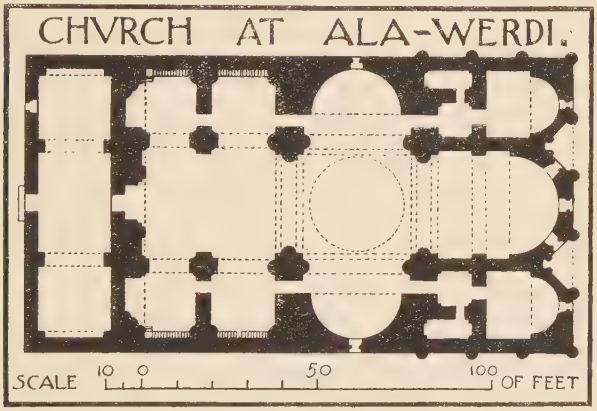


Fig. 175.

The other arches throughout the church are semicircular, and although no reason exists why the pointed form should not have been employed at this period in positions where greater strength was required, since it was common in the East centuries before, it is quite possible that the upper part is a rebuilding of later date. The plan of the Church of Ala-Werdi, in Georgia, is chiefly noticeable for the fact that the transepts terminate internally with apses, whilst preserving the square externally.

CHAPTER XIII.

CIRCULAR CHURCHES AND BAPTISTERIES.

Circular churches.

THE circular churches built between the tenth and twelfth centuries in Italy have not a tithe of the architectural interest possessed by those erected in the palmy days of Byzantine art, five or six hundred years before. Most of them follow the plans of old Roman buildings, and none has the internal colonnaded niches which give such charm to S. Vitale, etc. The Rotunda

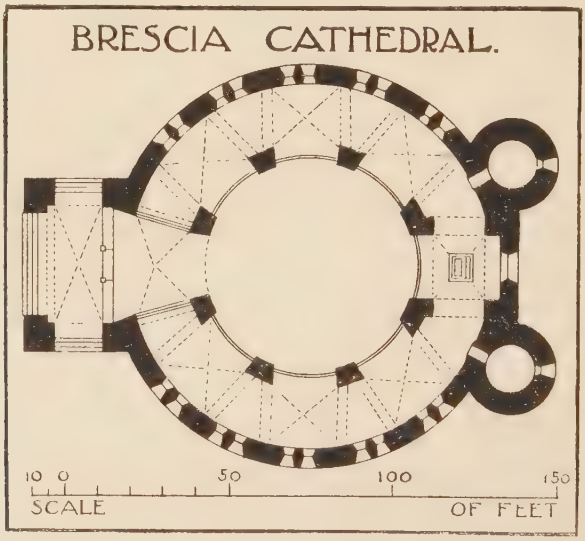


FIG. 176.

at Brescia is one of the most important, and consists of a central area surrounded by an aisle, from which it is separated by eight heavy quadrilateral piers. The central part is domed, and the aisles are vaulted. The vault is not a continuous barrel-vault, as in Roman circular buildings, such as the tomb of Costanza, but

is an intersecting vault, divided into square and triangular bays by transverse arches thrown across from the piers to the aisle wall. The vaulting is a proof that the church does not date from the time of Charlemagne, as was formerly supposed; and besides, on the outside, are arched corbel courses, pilaster strips and openings under the eaves below the flat-pitched timber roof, all of which are characteristic of Romanesque work of the eleventh and twelfth centuries. The crypt to the east of the present church is certainly of earlier date, but the church itself was probably rebuilt after a fire in 1097. A church similar in plan, except that it is multangular, is at Bologna. This forms one of a group of seven churches, or rather of five churches and two courtyards, known collectively as S. Stefano, which are united to one another.

S. Thomaso.

A small, but in some respects more important church than either of the above is S. Thomaso in Limine at Almenno, near Bergamo. It follows the plan, which was also sometimes adopted in German, English, and French churches of the same period, of a circular nave with an oblong bema, or chancel, which finishes with an apse. This church, and others similar, are sometimes stated to have been modelled on the plan of the Church of the Holy Sepulchre, at Jerusalem, which, as restored by the Crusaders, had a circular nave and a long chancel; but although this may be true of some, it is not so of all. Circular churches and baptisteries existed long before the Crusades; and some of them had either apses or oblong chancels at the east end. In Byzantine work, the plan was a common one. Take away the aisles and colonnaded niches of S. Vitale, Ravenna (see Fig. 153), and you have the idea of S. Thomaso. The Church of S. Donato, Zara, which dates from 810, has three eastern apses side by side; and the baptistery at

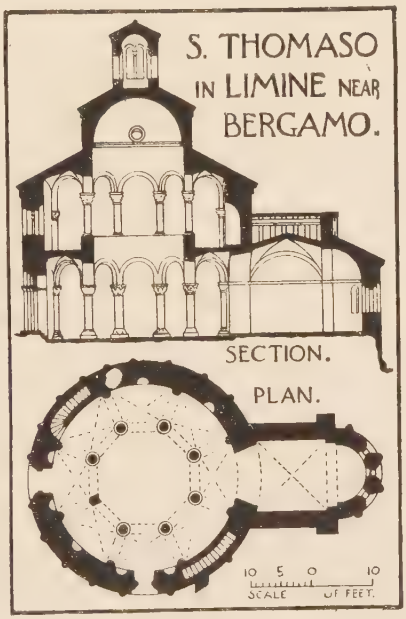


Fig. 177.

Grado of the sixth century, has a single elongated apse. It is more probable that such a church as S. Thomaso was a natural evolution from these and other similar buildings than that its plan was copied from the church at Jerusalem. The apses in some of these buildings may, of course, have been later additions,

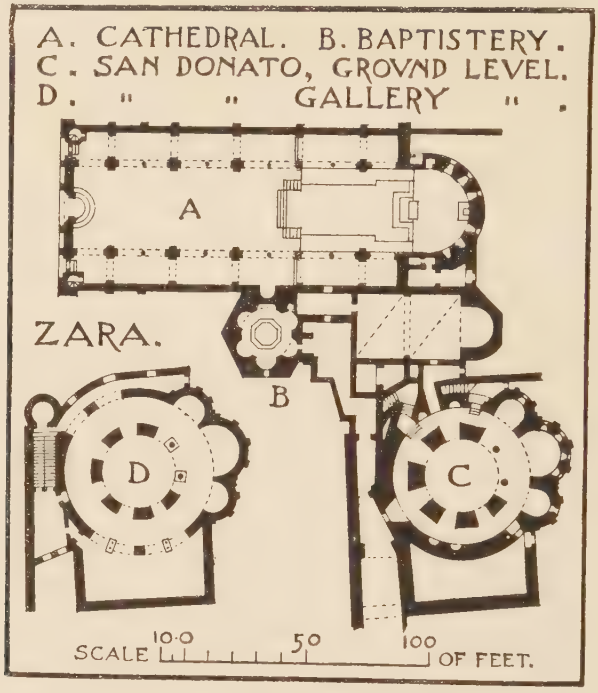


Fig. 178.
Jackson (Clarendon Press).

made when they were converted into churches, as was probably the case with S. George, Salonica (see p. 210); but if so, that merely shows how natural was the development. Over the aisle of S. Thomaso is a lofty gallery, and both aisle and gallery are separated from the central area by columns and arches.

Baptisteries.

Baptisteries of considerable size were a necessity in the days when adult baptism was general, and no one was admitted inside a church until he had been baptized. About the thirteenth century adult baptism fell into disuse, the old restrictions as to admission were removed, and in consequence detached baptisteries ceased to be built. A font placed inside a church became all that was

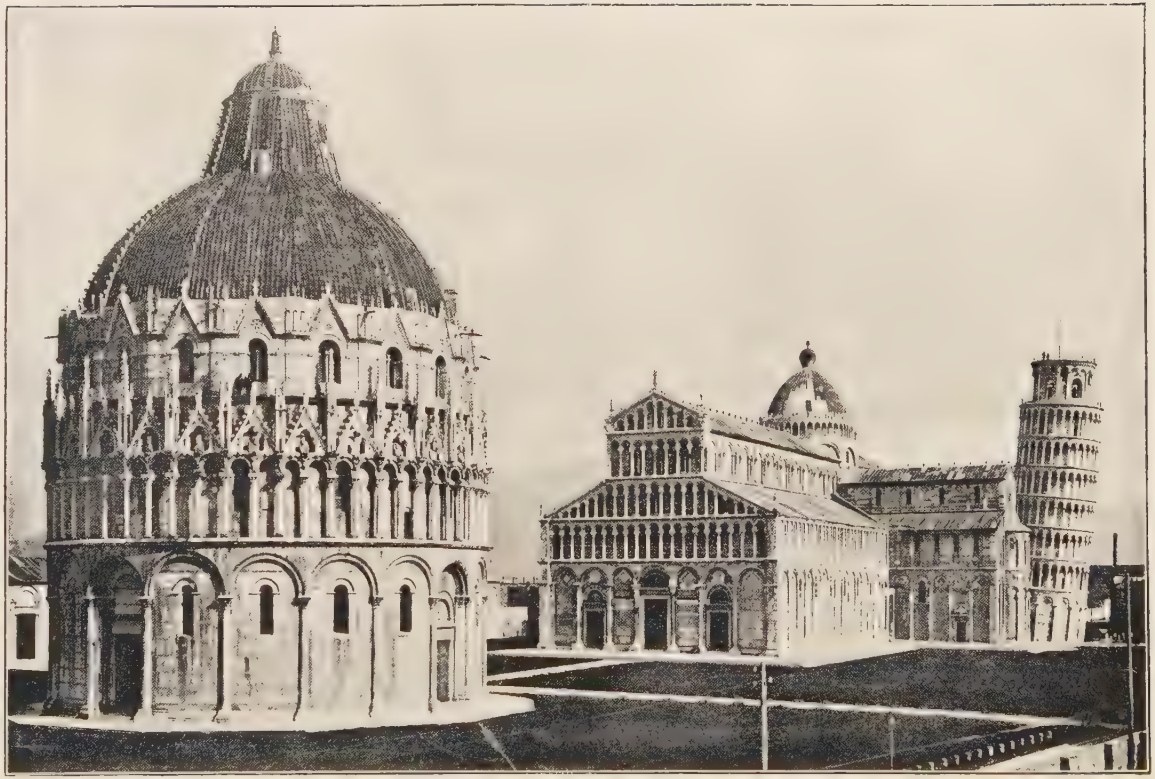


Photo: Alinari.

FIG. 179.—BAPTISTERY, CAMPO SANTO, CATHEDRAL, AND LEANING TOWER, PISA.

[*To face p.* 257.

necessary. A late example of a separate baptistery, which although small is very beautiful in design, is in a court alongside the cathedral at Bergamo. This may be regarded as a connecting-link between large buildings and fonts.

Novara, Alliate, Biella, and Asti.

Baptisteries present considerable variety in plan. Most are either circular or octagonal, and, as a rule, are aisled. At Novara, however, the Pantheon aisleless plan is followed, and in the thickness of the wall are eight recesses, alternately semicircular and rectangular. The baptistery of the ninth century near the cathedral at Alliate, would be nine-sided if it were not that the apse at the east end is the width of two sides. At Biella, in Lombardy, is a baptistery, the ground-floor of which is quatrefoil in plan, as a central square is surrounded by four projecting semicircular apses. Another in the vicinity is at Asti. This is a circular building, fifty feet in diameter, the central area, which is octagonal, occupying only one-third of the space, and the surrounding aisle the remaining two-thirds.

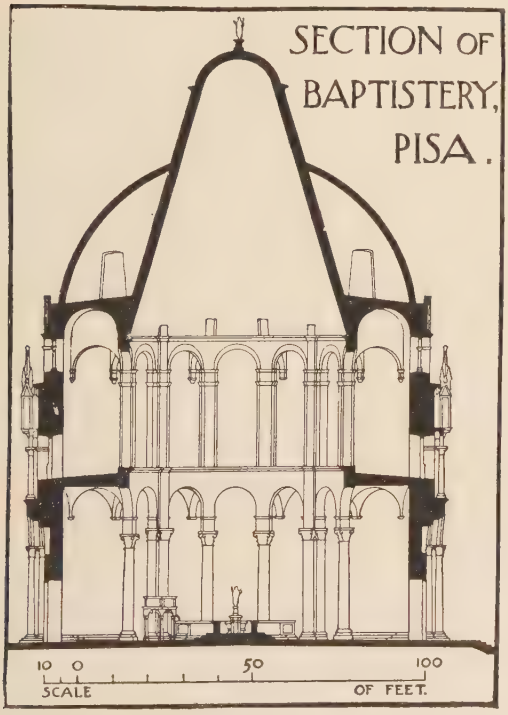


Fig. 180.

Pisa, Florence, and Parma.

The above are all small compared with the great baptisteries at Pisa, Parma, and Florence. The first is circular in plan; the two last octagonal. The baptistery at Pisa was begun in 1152, nearly one hundred years after the commencement of the cathedral. The upper part was unfortunately "ornamented" in the fourteenth century and the whole is surmounted by what is probably the ugliest dome in Christendom. The interior is one hundred feet in diameter, and is divided into

an inner circle and a surrounding aisle by twelve columns and four piers. The aisle is vaulted, and over it is a gallery. The central area, nearly sixty feet wide, is covered by a huge cone of brick,[1] which cuts through the outer dome, of the same material, which starts from the aisle wall.

The baptistery at Florence, formerly the old cathedral dedicated to S. John, has an apse on each of its eight sides concealed in the thickness of the wall. In front of each apse are two columns, so that, except for its shape, the building follows the plan of the Pantheon at Rome. A triforium comes over the apses, and is well lighted by windows on the outside wall. In the baptistery at Parma, the interior is covered by a dome, but this does not show outside, as it is concealed entirely by walls which rise high above its springing. These walls have four tiers of galleries on each side, similar to those at the west end of Pisa Cathedral, except that the slender, detached shafts in front support lintels and not arches. One feels here, as elsewhere, the superiority of the lintel over the arch in places where openings are small, the weight to be carried insignificant, and the treatment a purely decorative one.

[1] Some writers assert that Sir Christopher Wren got his idea for the cone which carries the cupola of S. Paul's Cathedral from this building. If this be so, he had the good taste not to allow the top of the cone to show above the outer dome. The cone of the Pisan baptistery may possibly have been suggested by the interior of the tomb of Cæcilia Metella, outside the walls of Rome, which is also sugar-loaf shape.

APPENDIX.

THE following table gives the approximate superficial areas of typical buildings, or portions of buildings, in different countries and built at different periods, and the percentages of their voids and solids. No account has been taken of windows and door openings. The hypostyle hall at Karnak has the greatest area of supports, notwithstanding that only one of its pylons is included, and no wall taken on the opposite side of the hall. Next comes the Pantheon, the ground floor niches being deducted, but no allowance made for other niches in the thickness of the wall. The Basilica of Trajan and the basilican Church of S. Paolo fuori le Mura, Rome, have the smallest areas of supports, which is only natural considering the slightness of their roofs. S. Sophia, Constantinople, has only 16 per cent. of supports, notwithstanding its high vault and lofty dome.

Type.	Name of building.	Area in superficial feet.	Percentage of	
			Solids.	Voids.
Egyptian . .	Hypostyle hall at Karnak (pylon one side only included)	86,074	36	64
Persian. . .	Hall of Xerxes (including porticoes and walls)	105,968	25	75
Greek . . .	Parthenon (including peristyle)	22,750	19	81
Roman . . .	Basilica of Trajan (including apses)	99,472	12	88
	Basilica of Constantine (openings in transverse walls deducted)	60,832	17	83
	Pantheon (Rotunda only) (niches ground floor deducted)	25,165	29	71
Byzantine. .	S. Sophia, Constantinople (exclusive of narthex)	58,760	16	84
	S. Vitale, Ravenna (exclusive of porch and staircases)	12,299	19	81
	S. Mark's, Venice (exclusive of narthex)	29,133	25	75
Basilican . .	S. Paolo fuori le Mura (exclusive of narthex)	82,757	9½	90½

INDEX.

Abacus, additional, examples of, 192
Abu Sargah, church of, 196–197
Acropolis, *see under* Athens
Ægina, temple at, 93 *and note*
Agrigentum, *see* Girgenti
Alabaster—
  Assyrian use of, 35; winged bulls of, 39
  Egyptian use of, 21
  Pelasgic use of, 51
  Roman use of, 122
Ala-werdi, church at, 252–253
Alliate, baptistery at, 257
Amasis, King, 16
Amenophis III., King, 19, 29
Anderson *cited*, 137 *note*
Ani, cathedral at, 252
Anthemius of Thralles, 228
Apollodorus of Damascus, 103, 128
Aqueducts, Roman, 160–162
Arches (*see also* Vaults)—
  Corbel, 25
  Decorative use of, 39
  Egyptian, 13, 24–25
  Etruscan, 101–103
  Gateways, of, in Assyria, 39
  Greek exclusion of, from temples, 60
  Inverted, in foundations, 24 *note* [1]
  Pelasgic, 51–52 *and note*
  Roman use of, 111, 142; construction, 118
  Segmental, 8
  Squinch, 167
  Syrian, 201
  Triangular, 52
  Triumphal, 157; in Christian churches, 177
  Voussoir, 24
Architects, Egyptian, *status* of, 32
Architraves—
  Greek, 86–87
  Persian, 44 *and note*
Armenia, churches in, 252
Ashlar, Roman facings of, 115
Asia Minor, Ionic temples in, 66 *note* [1], 69 *note* [2], 81
Assyrian and Babylonian architecture—
  Decay of, 35
  Decoration, 40–41
  Gateways, 39
  Khorsabad palace, 36–37
  Lighting, 38
  Palaces, 36–38
  Sculptured slabs, 40
  Temples, 35–36
  Thickness of walls, 38
  Tower of the Seven Planets, 36, 37
Assyrian Empire, 34
Asti, baptistery at, 257
Athens—
  Acropolis at, 58, 76 *and note* [2]
  Cathedral of, 251
  Churches in, size of, 235
  Daphni, Church of, 249–250
  Odeum, the, 153
  Propylæa at, 76, 89
  S. Theodore, church of, 250–251
  Temples at—
    Erechtheum, 78–81, 91
    Hexastyle, 74
    Nike Apteros, 78, 92
    Octastyle, 72
    Parthenon, *see that title*
    Theseum, 73–74, 92, 93, 97
Atreus, tomb of, 53–54

Babylon, walls of, 39
Babylonian architecture, *see* Assyrian
Babylonian Empires, 34
Baalbec, temples at, 137, 142
Baptisteries—
  Constantine, of (Rome), 208, 229
  Early use of, 256
  Examples of, 257–258
  Form of, 206
  Position of, 179

Base—
Slabs, insertion of, 65 *and note* [1]
Basilican churches—
Advantages and drawbacks of, 194
Apses of—Roman plan of, 199; polygonal on both sides, 202
Bethlehem, at, 198
Byzantine churches in conjunction with, 225
Constantinople, at, 198
Construction of, 175; in Egypt, 195
Coptic, in Egypt, 195–198
Dair-as-Sûriâni, at, 196–197
Decoration of, 182
Five-aisled, 185
Floor of, 182–183
Galleries in, for women, 176, 195, 199
Gothic contrasted with, 194
Istria, in, 189, 192–193
Jerusalem, at, 198
Lighting of, 181–182; Syrian method, 201, 203
Mosaics in, 182, 188
Ravenna, at, *see* Ravenna
Roofs of, 182
Salonica, at, 198–200
Screens in, 195
Spaciousness of, 193–194
Syrian, 200–204
Term, use of, 174–175
Three-aisled, 186 (see also S. Maria Maggiore)
Torcello, at, 191–192
Triapsal, 195
Basilicas, *see under* Roman Architecture
Bassæ, temple of Apollo at—
Columns of, 69 *note* [2]; bases of, 66; Corinthian column, 81–82
Combination of orders in, 61
Description of, 74
Frieze of, 74, 93
Pilasters in, 69, 74
Tiled roof of, 88
Volutes in, 65
Batter, 92 *note* [2]
Bee-hive tombs, 54
Beni-Hasan tombs, 8–9, 30, 48 *note*
Bergamo—
Baptistery at, 257
S. Thomaso in Limine near, 255–256
Bethlehem, church of S. Mary at, 198
Bi-apsal (S. Sophia), 229
Biella, baptistery at, 257
Bologna, S. Stefano at, 255
Brescia—
Cathedral of, 254–255
Triple-celled temple at, 136–137
Brick—
Babylonian use of, 33, 35
Cut-brick ornament, 219
Egyptian, 21, 24 *and note* [2]
Roman—kinds of, 116; use of, 117–118
Shaping of, in Babylonia, 38 *note* [1]
Stone courses alternating with, 218
Bridges, Roman, 159–160
Bronze—
Bands of, on columns, 221
Doors of, 97
Gates of, at Babylon, 39
Greek use of, 85, 97 *and note*
Pelasgic use of, 51, 53, 54
Roman use of, 123–124
Butler, Dr., *cited*, 172
Butterfly pattern, 50
Buttresses, Roman use of, 132, 146
Byzantine Architecture—
Baptisteries, 257–258
Churches, *see* Byzantine churches
Periods of, 213
Roman compared with, 217
Byzantine churches—
Apses of, 189; internal, 253
Armenia, in, 252
Basilican churches in conjunction with, 225
Bergamo, S. Thomaso in Limine near, 255–256
Bologna, S. Stefano at, 255
Brescia Cathedral, 254–255
Capitals in, 220–221
Circular buildings, 209–210, 254–256
Classic entablature, example of, 226
Columns in, 221
Constantinople, in, *see under* Constantinople
Construction and materials of, 217–219
Decoration of, 219–220
Domes of—
Construction of, 216–217
Four-centred, 217 *note* [1]
Lighting of, 216, 226, 232–233
Pendentives and corbels for, 214–215
Simple and compound, 215 *and note* [2], 216

Byzantine churches—*continued.*
Ezra, S. George at, 224–225
Galleries in, for women, 223, 233
Georgia, in, 252
Greece, in, *see under* Greece
Kalat-Seman, at, 225
Milan—
S. Lorenzo, 227, 228
S. Satiro, 247–248
Niches in, effect of, 224
Octagonal, 226
Pendentives in, 214–215
Periods—first, 224–234; second, 235–236
Plans of—first period, 223–234; second period, 236–256
Ravenna, at, *see* Ravenna
Salonica—
S. Elias, 241
S. George, 209–210, 256
S. Sophia, 190, 223, 237–238
Torcello, S. Fosca at, 191, 248
Triapsal, 223
Venice, *see* S. Mark's
Windows in, 221–223, 226, 232–233
Zara, S. Donato at, 255

Cairene churches, 196
Canterbury, orientation of S. Augustine's Church at, 180 *note*
Callicrates, 73, 78
Camber, 92 *note* [1]
Canina *cited*, 129
Capitals—
Assyrian, 40–41
Byzantine, 220–221
Corbel, 222
Corinthian, 66, 95
Doric, 64
Dosseret, 171
Egyptian, 26–28
Ionic, 65
Mixture of orders in Christian churches, 180
Persian, 45–46
Ravenna churches, in, 189–190
Roman Corinthian, 110
S. Mark's (Venice), in, 245
Trajan's column, of, 158
Carving—
Byzantine, 220
Egyptian, 21, 29
Caryatid porch of the Erechtheum, 78 79, 94
Cathedrals, heights of vaults of, compared, 233 *note*
Cattaneo *cited*, 241
Ceilings, *see* Roofs
Cerveteri, tumuli near, 103
Chaqqa, Basilica at, 204
Chedanne *cited*, 121, 139
Choisy *cited*, 22 *note*, 119, 121 *note*, 217 *note* [2]
Chosroes I., King, 166
Christian churches, early—
Atria of, 179
Baptisteries, position of, 179
Basilican, *see that title*
Chancels of, 177–178; raised, 178, 186, 190
Circular, 206–210
Cloisters of, 188
Doorways of, 179
Galleries in, for women, 176, 223, 233
Lintels and arches in, 181
Materials, old, re-use of, 180
Orientation of, 179–180 *and note*, 198, 229
Plan of, 172; development of, 175–176; triapsal plan, 177
Pre-Constantinian, 172
Ravenna, at, 169, 171; raised chancel in S. Apollinare, 178
Rome, in, *see under* Rome
Screens in, 187–188
Triapsal, 177
Triumphal arch in, 177
Cleopatra's needle, 29
Cockerell, Prof., *cited*, 88, 98 *note*
Colosseum—
Arches of, construction of, 119
Columns of, 107, 112
Dimensions and plan of, 149–152
Entablatures of, 112, 150–152
Orders in, 112
Plaster panelling in, 124
Colossi, Egyptian, 29
Coloured tiles, Persian use of, 46 *and note*
Columns—
Assyrian, 40
Banded with bronze, 221
Beni-Hasan, at, 8–9
Byzantine, 221
Carved figures on, 81 *and note* [2]

Columns—*continued.*
Corinthian, 81–82
Decorative, 111–112, 115, 139
Diminution in diameter of, 91, 228
Doric, 64, 65 *note*, 67, 72, 91
Drums of, 86, 122
Egyptian—structure of, 25–26; proportion of, 44
Entasis of, 91–92, 228
Fluted—
Construction of flutes, 90
Doric, 64 *and notes* [1], [3]
Ionic, 65
Persian, 45
Reason for flutes, 66 *and note* [2]
Greek temples, number and arrangement for, 69 *and notes*
Ionic, 65 *and note*, 67
Joints in, 89 *and note*
Lotus, 9
Mixture of, in Christian churches, 180
Oval, 221
Pelasgic, 55 *and note* [2]
Persian, 44–45
Piers in substitution for, 224
Proportions of Egyptian and Persian, compared, 44
Proto-Doric, 9
Refinements in construction of, 91–92
Roman use of, 111–112, 115; unfluted, 122; in temple of Castor, 134 *and note*
Spacing of, 91 *and note*
Tapering, 55
Triumphal, 158
Upper tier, 69, 74
Waxing of, 95
Composite order, 110–111
Concrete, Roman use of, 115–118
Constantinople, churches at—
Holy Apostles, 237
Monastery of the Chora, 240–241
S. Irene, 218, 238–239
S. John the Baptist, 198
S. Saviour Pantepoptes, 241
S. Sophia, *see that title*
S. Theodore, 239–240
SS. Sergius and Bacchus, 225–226
Corbels—
Byzantine use of, 215
Cornice with, 152 *and note*
Window shafts on, 222
Cori, temple at, 107
Corinthian Order—
Buildings of, 81–82, 136, 142
Capitals of, 66, 95
Roman elaboration of, 110
Cossutius, 72, 103
Crete, excavations at, 50–51
Crypts, burial in, 178 *and note*

Dair-as-Sûriâni, church of, 196–197
Decoration—
Acanthus pattern, 95
Anthemion (honeysuckle) pattern, 30, 78, 95
Assyrian, 40–41
Basilican churches, of, 182
Bronze plates, 54
Byzantine, 219–220
Coloured tiles, 46 *and note*
Cut-brick, 219
Egyptian designs, 30
Fret pattern, 95
Guilloche border, 30, 40
Mouldings, *see that title*
Painting, *see that title*
Palmette border, 40
Persian, 46
Pine-cone design, 46
Roman misuse of, 112, 124–125
Spiral, 50
Volutes—
Assyrian, 41
Ionic, 65
Persian, 45
Roman, 110
Dendereh, temples at, 18, 28; church in old temple, 196
Desert churches, 196–197
Designs, *see* Decoration
Dieulafoy *cited*, 163 *note*, 167
Domes—
Assyrian, 38
Byzantine, *see under* Byzantine churches
Coptic churches, of, 195
Drums of, 225, 235, 237, 239
Four-centred, 217 *note* [1]
Pottery, of, 216, 227
Roman, 121, 148
Semi-domes, 224
Square halls, over, 148, 167, 214
Supports of, at S. Sophia, 231

Domes—*continued.*
Table of diameters of, 236
Windows in, 216, 226, 232–233
Doors, bronze, 97, 141
Doorways, Greek, 55 *note* [1]; Roman, 141
Doric Order—
Columns of, 64, 65 *note*, 67, 72, 91
Frieze, construction of, 88; metopes of, 94
Illustration of, 62
Juxtaposition of, with Ionic, 61, 76, 77
Propylæa of, 76–77
Ratios in, 85 *note*
Remains of, 61
Roman modifications of, 106–107
Temples of—in Greece, 72–74; in the colonies, 74–76 (*see also* Parthenon)
Dörpfeld, Dr., *cited*, 79 *note* [2], 83, 100 *note*
Dosserets, 171, 221
Dowels, Egyptian use of, 21

Egypt—
Architects in, 32
Architecture of, *see* Egyptian Architecture
Art of, 2
Carving in, 21, 29
Christian Churches in, 169–170; White Convent, 180, 198
Colossi, 29
Domestic work of, 20
El-assanif tombs, 24
Gods of, 13
Kalabché, multangular columns at, 9, 28
Kings of, worship of, 13 *and note*; cartouches of, 17–18 *note*
Obelisks in, 29
Philæ—
"Pharaoh's bed" at, 19, 26
Temples at, 18
Remains of civilization of, 6
Sculpture in, 28–29
Sphinx at Memphis, 7
Egyptian Architecture—
Assyrian contrasted with, 33
Beni-Hasan tombs, 8–9, 30, 48 *note*
Greeks—influence of, 17, 19; influence on, 56
Heavy style of, 42,

Egyptian Architecture—*continued.*
Hieroglyphics, 29
Hypostyle hall at Karnak, 11, 14–15, 44, 259
Instruments of, 32
Labour available for, 1–2
Lintel and arch, 24–25
Mastabas, 5–7, 47, 48
Materials used in, 21; raising of, 22–23; transport of, 23–24
Memphite period, monuments of, 3
Mouldings in, 29–30
Paintings in, 30
Periods of, 2
Ptolemaic and Roman periods—
Small buildings of, 19–20
Temples of, 18
Traditions of, 17
Pyramids, 3–5; Theban, 7
Rock-cut tombs, 15–16
Scale of, 1
Theban period, first, monuments of, 7–9
Theban period, second—
Columns of, 26
Splendour of, 9
Temples of, 10; plans, 11; approaches, 12; rock-cut temples, 12; temple at Abydos, 13; lighting, 13–15 (*see also* Ramesseum, *under* Egyptian Architecture—Temples)
Tombs, rock-cut, 16
Workmanship of, 21
Temples—
Abydos, 13, 25, 28
Dendereh, 18, 28; church in old temple, 196
Edfou, 18, 19
Elephantine, 19
Esneh, 18, 28
Hypostyle halls, 11, 13, 44
Karnak, *see that title*
Lighting of, 13–15, 75; by hypæthron, 19
Lintels—broken, 18, 20; length of, 22
Luxor, 10, 12
Medinet-Abou, 10, 13, 29
Objects of, 12 *note*
Philæ, at, 18
Plans of, 11, 18

Egyptian Architecture—*continued.*
Temples—*continued.*
Ptolemaic, 18
Pylons of, 11–12
Ramesseum, the—
Bricks in, 24 *note* [2]
Dimensions and plan of, 10, 12–13
Lighting of, 15
Sculpture at, 29
Rock-cut, 12
Theban period, of, 10
Workmanship, 21–24
Eleusis, columns at, 55
Enrichment, *see* Decoration
Entablature—
Bent round arch, 113–114
Byzantine example of, 226
Doric, 64
Persian, 42
Rise in, 92
Roman construction of, 111–112, 130
Unbroken, in the Colosseum, 150–152
Epidaurus—
Capital from, 66
Tholus at, 82
Epiphany tanks, 196
Erechtheum, the, 78–81; diminution of columns of, 91; frieze at, 94
Etruscan architecture, 102–103

Fergusson *cited*, 37, 84, 112
Fiesole, ruins at, 103
Flandin and Coste *cited*, 166 *note*, 167
Florence—
Baptistery at, 258
Cathedral at, 231 *note*
Floors—
Basilican churches, of, 182–183
Marble, 89
Opus Alexandrinum (Cosmato), 183
Frieze, jointed, 134

Galetting, 24, 51 *and note*
Gateways—
Arched, in Assyria, 39
Windows in, 38 *note* [2]
Gayet, Mons. A., *cited*, 198
Georgia, churches in, 252
Girgenti, temples at—
Columns in, 69 *note* [2]
Jupiter, temple of, 64
Plan of, 75
Girgenti, temples at—*continued.*
Site of, 58
Stucco in, 85
Gothic art, canopied niches in, 94
Grado—
Baptistery at, 256
Cathedral at, 189; mosaic pavement, 193; windows, 222
Granite, Egyptian use of, 21
Greece, Byzantine churches in, 248–251 (*see also* Athens)
Greek Architecture—
Hellenic, *see that title*
Houses, 97–98
Pelasgic, *see that title*
Temples, conversion of, into Christian churches, 60, 73, 173
Greek Church, the, altar in, 223, 229 *note*
Greek churches, size of, 235
Greek civilization, 56

Hellenic Architecture—
Choragic monument, 82
Corinthian Order, *see that title*
Doric Order, *see that title*
Ionic Order, *see that title*
Lintel construction, 60
"Orders," division into, 61
Orthostatæ, 86 *note*
Period of, 57
Philippeion at Olympia, 82
Propylæa, 76–77; rise in stylobate and entablature, 92
Sites, 57–58
Temples—
Ægina, at, 93 *and note*
Bassæ, at, *see* Bassæ
Columns for, number and arrangement of, 69 *and notes*
Construction and workmanship of, 86–90
Conversion of, into Christian churches, 60, 73, 173
Corinth, at, 72
Decastyle, 81
Destruction of, 58–60
Doric Order, examples of — in Greece, 72–74; in the colonies, 74–76
Ephesus, at, 65, 81, 91 *note*
Epidaurus, Tholus at, 60, 82
Erechtheum, *see that title*

Hellenic Architecture—*continued.*
Temples—*continued.*
Figures in, 69, 75–76
Girgenti, at, *see* Girgenti
Hexastyle, examples of, 69 *note* [2], 72, 74, 76
Lighting of, 83–84
Materials of, 85
Nike Apteros, 78, 92
Octastyle—at Athens, 72; in Sicily, 74; in Asia Minor, 81
Olympia, at, *see* Olympia
Pæstum, at, 69 *and note* [2], 74, 85
Painting on, 95–97
Parthenon, *see that title*
Peristyle of, 71
Plans of, 69–71
Proportions of, 84
Roofs of, 88
Sites of, 58
Stylobate of, 71
Table of (order, measurements, etc.), 70
Theseum, 73–74, 93, 97
Tombs, 98
Tower of the Winds, 82
Hieroglyphics, 29

Iconostasis (screen), 223
Ictinus, 73 *and note*, 78
Ionic order—
Description of, 65
Illustration of, 63
Juxtaposition of, with Doric, 61, 76, 77
Ratios in, 85 *note*
Roman modification of, 110
Temples of, 77–81, 91 *note*
Isidorus of Miletus, 228
Istria, churches in, 189, 192–193
Italy—
Greek influence in, 170–171
History of, from fifth to eighth centuries, 170

Jackson *cited*, 193 *and notes*
Jerusalem, Church of the Holy Sepulchre at, 198
Jews, Temple of, 46–47
Joints, perfection of, in Athenian work, 89 *and note*
Justinian, Emp., 228, 236–237

Kalat-Seman, churches at, 201–202, 204–205, 225
Karnak, temple at—
Additions to, 18
Carving at, 28, 29
Columns at, 25
Dimensions and plan of, 10
Granite in, 21
Hypostyle hall of, 11, 14–15, 44, 259
Lighting of, 15
Pylons at, 11–12
Knossos, excavations at, 51
Kusr-en-Nûreijîs, domed building at, 214

Letarouilly *cited*, 175 *note*
Lethaby and Swainson *cited*, 222, 229
Lighting of churches—
Byzantine, 221–223, 226; S. Sophia, 232–233; S. Mark's, 244
Dome, in, 210, 216, 226, 232–233
Lighting of palaces in Assyria, 38–39
Lighting of temples—
Egyptian, 13–15; by hypæthron, 19
Greek, 75, 83–84
Roman, 140, 142
Lintel—
Arched, 201
Egyptian, 24; broken lintel, 18, 20
Greek use of, 60
Lloyd, Dr. Watkins, *cited*, 84 *and note* [2]
Lotus flower, 26 *note*
Lycia, tombs in, 47

Marble—
Church faced with, 251
Floors of, 89
Greek use of, 77, 85, 88
Kinds of, 85
Roman use of, 122–123
Roofing tiles of, 88
Screen of columns of, in S. Sophia, 231–232
Wall-linings of, in churches, 226–227, 240–241
Window-fillings of, 222, 252
Mariette *cited*, 12 *note*
Messina, tomb at, 221
Metal cramps, 116, 123
Middleton, J. H., *cited*, 116 *and note* [3], 118 *note*, 121 *note*, 128, 136, 145, 153, 154 *note*, 159, 160

Milan—
San Ambrogio, 178
San Lorenzo, 227–228
Mnesicles, 76
Mortar, Egyptian use of, 21
Mosaic—
Basilican churches, in, 182, 188
Byzantine interiors, in, 219–220, 245, 250; at Ravenna, 190, 191
Coptic churches, in, 196
Greek, in Italy, 171
Mouldings—
Decoration of, Greek, 95
Doric, 64
Egyptian, 29–30
Gorge, 29–30
Hood-moulding, 219 *and note*
Mycenæ, remains at, 50–54

Naples, circular church at, 140 *note*
Naucratis, architecture of, 16–17
Nero, Emp., building regulations of, 154 *and note*; "Golden House" of, 156
Nîmes—
Maison Carrée at, 133, 136, 138
Pont du Gard at, 160–162
Roman baths at, 121–122
Nocera, baptistery at, 209
Novara, baptistery at, 257
Nubia, rock-cut temples of, 12

Obelisks, 29
Olympia—
Church at, oval columns in, 221
Heræon, the—
Construction of, 86 *note*
Intercolumniation in, 91 *and note*
Jupiter, temple of—
Columns of, 69 *note*[2]
Injuries to, 72
Statue in, 69
Stucco on, 85
Stylobate steps of, 71
Orange, theatre at, 154
Orientation of churches, 179–180 *and note*, 198, 229
Orleansville, church at, 229 *note*

Padua, S. Antonio at, 247
Painting in decoration—
Colours used in — Egyptian, 30; Assyrian, 40; Greek, 95
Painting in decoration—*continued.*
Figures, of, 95–97
Medium of—on Greek temples, 95; Roman, 125
Method of, 95–97
Roman interiors, in, 125
Sculptured drapery, of, 94
Palmyra, temple at, 138
Panels—
Paintings on, 95
Roman use of, 90 *note*[1], 116 *and note*[1]; interior, 124, 125
Pantheon—
Columns in, 115
Construction of, 121
Copy of, at Naples, 140 *note*
Dome of, 140, 231 *note*
Doorway of, 141
Entablature of, 110
Lighting of, 140
Portico of, 138–139; construction of ceiling, 123
Roof of, 123–124
Rotunda of, 139–142
Table of areas of, 259
Parenzo, cathedral at, 189, 192–193
Parma, baptistery at, 258
Parthenon—
Architects of, 73 *and note*
Architraves of, 88
Bronze screens in, 97
Columns of, 69
Date of, 73
Dimensions and ratios of, 84 *note*[2], 91
Doorway of, 83 *note*
Entablature, rise of, 92
Entasis of peristyle of, 92
Explosion in, 60
Floor of, 89
Lighting of, 83
Plan of, 67 *and note*, 69
Pyramidical appearance of, how obtained, 92
Sculpture on, 93
Site of, 73
Steps of, 71 *note*
Style of, 61
Stylobate, rise of, 92
Table of areas of, 259
Pelasgi, ornaments of, 50–51
Pelasgic architecture—
Columns, 55 *and note*[2]

Pelasgic architecture—*continued.*
Lions' Gateway, 52–53
Materials and workmanship, 51
Period of, 49
Tombs, 53–54
Pendentives, 167, 214–215; in S. Sophia, 231 *and note*
Penrose *cited*, 89, 90
Perrot and Chipiez *cited*, 12 *note*
Persepolis, buildings at, 43–44
Persian architecture—
Characteristics of, 41–42
Columns and capitals, 44–46
Decoration, 46
Halls, 43–46, 259
Palaces, 43
Sasanian, *see that title*
Tombs, 42, 48 *note*
Persian kingdom, 41
Perugia, circular church at, 208
Petra, tombs at, 159
Petrie, Prof. Flinders, *cited*, 21, 24
Pheidias, 73 *and note*, 93
Phœnicians, 46
Phocis, Monastery of St. Luke in Stiris in, 251–252
Pisa, baptistery and cathedral at, 257–258
Place *cited*, 37, 167
Pompeii—
Decorative designs at, 125; curved volutes, 65
Domestic remains at, 154–155
Mixture of styles at, 61 *note*
Pansa, house of, 155
Plan of, 126, 155
Stucco at, 123
Theatres at, 154
Priene—
Domestic remains at, 98
Temple at, 66 *note* [1], 69 *note* [2]
Procopius *cited*, 228, 237
Psammetichus II., King, 16
Puchstein, Prof., *cited*, 100 *note*
Pyramids, 3–5; Theban, 7

Qalb Louzeh, church at, 202–204

Rameses I., King, 13 *note*
Rameses II., King, 9; figures of, 12, 13, 29
Rameses III., King, tomb of, 16; pavilion of, 20
Ravenna—
Apses of churches at, 189
Mausoleum of Galla Placidia at, 206, 215; mosaics at, 219
Mausoleum of Theodoric at, 210–212
Periods of churches at, 189
S. Agatha, 180
S. Apollinare in Classe—
Apse of, 189
Arcading in, 183
Bays in, 194
Characteristics of, 169
Illustration of, 184
Plan and dimensions of, 190–191
Raised chancel in, 178
S. Apollinare Nuovo, 190, 191
S. Vitale—
Capital in, 220, 221 *note*
Dome of, 216
Plan of, 226–227
Table of areas of, 259
Roads, Roman, 159
Rock-cut churches—in Egypt, 12; in Cappadocia, 172
Rocker, Egyptian, 22–23
Roman architecture—
Amphitheatres—
Colosseum, *see that title*
Principal, 149
Provincial, 152–153
Arches in, 111–115, 118; triumphal, 157–158
Basilicas—
Christian churches compared with, 174
Constantine, of—
Construction of, 130, 145
Dimensions of, 148, 229–231, 259
S. Sophia compared with, 229–231
Table of areas of, 259
Construction of, 130–132
Conversion of, into Christian churches, theory as to, 173
Domitian, of, 129
Original purpose of, 128
Trajan, of, 128–129, 259
Baths (Thermæ), 143–147
Buttresses, 132, 146
Byzantine compared with, 217
Characteristics of, 101–102
Cities, planning of, 126
Colosseum, *see that title*

Roman Architecture—*continued.*
Columns in, 111–112, 115
Country houses, 156–157
Divisions of, 105
Domes in, 148
Domestic work, 154–157
Etruscan influence on, 102–103
Fora, 126–128
Greek influence on, 103
Materials used in, 115–118, 122–124
"Orders," 106, 108
Palaces, 155–156
Panel scheme in, 90 *note*,[1] 116 *and note*;[1] interior, 124, 125
Period of, 104
Planning of, 113–115
Scattered examples of, 105
Temples—
Circular, 142 (*see also* Pantheon)
Conversion of, into Christian churches, 173
Dimensions of, 138
Eastern, 137
Lighting of, 140, 142
Rectangular, peculiarities of, 123
Rome, in, *see under* Rome
Pantheon, *see that title*
Provincial, 136
Pseudo-peripteral, 136
Uses of, 132–133
Theatres, 112, 153–154
Tombs, 103, 158–159
Triumphal arches, 157–158
Vaults and domes, 119–122, 132; dimensions of vaulted halls, 148
Rome—
Aqueducts, 160
Arch of Titus, 111, 157
Baptistery of Constantine, 208, 229
Baths—of Caracalla, 144–145; of Diocletian, 145–146, 229; of Gallienus, 146–147, 236
Bridges, 159
Castor and Pollux, temple of, 134 *and note*
Cloaca Maxima, 102–103
Cloisters of churches in, 188
Faustina, temple of, 136
Fortuna Virilis, temple of, 133, 136
Livia, house of, 125
Mars Ultor, temple of, 134–135
Palaces, 155–156
Rome—*continued.*
Pantheon, *see that title*
Roads from, 159
Romulus, temple of, 141
S. Agnese—
Arches in, 181
Gallery in, 176, 186, 195
Mosaics in, 182
Orientation of, 180
Plan of, 176
S. Clemente, 179, 180, 187; floor of, 183
S. Costanza, tomb of, 182
S. Giovanni in Laterano, 185; cloisters of, 188; baptistery attached, 208
San Lorenzo—
Gallery in, 176, 186
History of, 186–187
Lintels in, 181
Orientation of, 180
Pulpit of, 183
S. Maria in Cosmedin, 177, 178, 180, 222
S. Maria in Trastevere, 181, 183
S. Maria Maggiore, 173, 180–183, 186
S. Paolo fuori le Mura—
Arches in, 181
Cloisters of, 188
Dimensions of, 185–186, 194
Table of areas of, 259
S. Peter's (five-aisled basilica), 181, 185
S. Peter's (modern), dome of, 231 *note*
S. Prassede, 181, 182
S. Pudenziana, 182
S. Sabina, 181, 182
S. Stefano Rotondo, 206–208
Saturn, temple of, 110
Theatre of Marcellus, 112, 153
Tomb of Costanza, 208–209, 229
Trajan's column, 158
Venus and Rome, temple of, 133, 135–136, 186
Vespasian, temple of, 136
Roofs and ceilings—
Curved in segmental form, 8 *and note*
Figures in support of, 94
Greek temples, of, 88
Marble, of, 88
Posts supporting, theory as to, in Babylonia, 37

Roofs and ceilings—*continued.*
Stone-vaulted, in the Haouran, 204–205
Timber—of Trajan's basilica, 128; of Basilican churches, 182; of Syrian churches, 204; of San Stefano Rotondo, 206
Vaulted, *see* Vaults
Roueiha, church at, 202–203

S. Mark's, Venice—
Exterior of, 245–246
Fittings of, 245
Lighting of, 244
Mosaics in, 245
Narthex of, 223
Plan of, 241–242
Proportions of, 244
S. Sophia compared with, 244 *and note*
Table of areas of, 259
Windows of, 222
S. Paul's, London, 231 *note;* cupola of, 258 *note*
S. Sophia, Constantinople—
Capitals in, 221
Carving in, 220
Date of, 169
Dimensions of, 233
Dome of—construction of, 231; height of, 233
Exterior of, 231, 233–234
Minarets of, 234
Narthex in, 229 *note*; dimensions of, 233
Original church of, 228
Plan of, 228–233
Sacking of, by Christians, 223
S. Mark's compared with, 244 *and note*
Screen of columns in, 231–232
Silver screen in, 223
Table of areas of, 259
Turkish circles in, 233
Windows of, 222–223
S. Sophia, Salonica, 199, 223, 237–238
Salonica, churches at—
Basilican, 198–200
S. Elias, 241
S. George, 208–210, 256
S. Sophia, 199, 223, 237–238
Sargon's palace, 37
Sasanian Architecture—
Ctesiphon, palace at, 165–166
Firouz-abad, palace at, 165
Serbistan, palace at, 164–165
Sasanian period, 163
Scale, methods of obtaining, 115, 139, 224, 331
Schultz and Barnsley *cited*, 252 *note*
Scott *cited*, 129, 172, 173, 174, 180 *and note*
Screen (iconostasis), 223
Sculpture—
Assyrian, 40
Egyptian, 28–29
Greek, 64–65, 92–94
High-relief, 29, 93, 98
Low-relief, methods of, 28–29
Seti I., King, temple of, 13, 28; tomb of, 15–16
Sicily—
Syracuse Cathedral, 173–174
Temples in, 74–76 (*see also* Girgenti)
Theatre at Taormina, 100
Spalato, palace at, 113, 114, 156
Sphinx at Memphis, 7
Sphinxes lining temple approaches, 12
Spiers, R. P., *cited*, 137 *note*, 166, 167
Stalactitic vaults, 197–198
Stone—
Assyrian facings of, 35
Brick courses alternating with, 218
Pelasgic use of, at angles, 51
Persian use of, 41
Roman kinds of, 115–116
Size of blocks at Baalbec, 137 *and note*
Syrian churches, in, 200
Vaults of, Roman, 121–122
String-courses, Byzantine use of, 219
Stuart, *cited*, 89 *note*
Stucco—
Egyptian use of, 21–22, 30
Marble-dust, 85
Pelasgic use of, 51
Roman use of, 115, 123
Stylobate, rise in, 92
Sunk architraves, 44 *and note*
Syria—
Basilican churches in, 200–204
Byzantine church of S. George in, 215, 224–225
Domestic remains in, 172, 205

Syria—*continued.*
History of, 170
Hood-moulding in, 215, 219 *note*, 224–225

Temples, conversion of, into Christian churches, 60, 73, 173 (*see also under names of countries*)
Teos, temple at, 66, *note*,[1] 69 *note*[2]
Terra-cotta ornaments decorating eaves, 98
Texier and Pullan *cited*, 173, 174, 199
Theatres—Greek, 98–100; Roman, 112, 153, 154
Tiles—
Bronze, gold-plated, 123, 142
Flue-tiles, 143
Greek temples roofed with, 88
Marble, 88
Terra-cotta, 88
Tiryns, excavations at, 51–52
Tivoli—
Hadrian's villa at, 148, 156
Temple at, 142
Tombs—
Bee-hive, 54
Christian—
Costanza, of, 208–209, 229
Form of, 206
Ravenna, at, 206, 210–212
Egyptian rock-cut, 15–16
Greek, 98
Roman, 103, 158–159
Torcello—
Cathedral, 191, 192, 194
S. Fosca, 191, 248
Tri-apsal churches, 198, 223
Triglyphs, 64, 88
Trier—
Churches at, 225
Roman remains at, 129
Tumuli, Etruscan, 103
Tuscan order, 106 *and note*,[2] 107

Vaults (*see also* Arches)—
Babylonian, 37–38 *and note*[1]
Barrel—
Byzantine buildings, in, 218
Construction of, 119–122
Ctesiphon, at, 166
Pointed, 195
Basilicas, roofs of, 130
Drains, over, 38
Intersecting, 119–121
Roman, 119–122; thickness of, 132
Roman vaulted buildings, dimensions of, 148
Ventilation, cylindrical tubes for, 167
Vitruvius *cited*, 103, 106 *note*[1]

Walls, Roman, thickness of, 118; cavity, 125
Water-clocks, 82
Windows—
Basilican churches, of, 181–182; at Roueiha, 203
Byzantine, 221–223
Coloured glass in, 222–223
Domes, in, 210, 216, 226, 232–233
Gateways, in, 38 *note*[2]
Greece, in, 84
Hood-moulding over, 219 *and note*
Marble fillings for, 222, 252
Pompeii, at, 155
Recessed, at west end of churches, 201
Wood—
Copies from, in Greek architecture theory as to, 47, 66–67
Persian use of, 41–42

York Cathedral, 194

Zara, church of S. Donato at, 255

END OF VOL. I.

PRINTED BY WILLIAM CLOWES AND SONS, LIMITED, LONDON AND BECCLES.